CORONARY ANGIOGRAPHIC PROFILE IN PATIENTS WITH FAILED THROMBOLYSIS

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CERTIFICATE

This is to certify that the dissertation titled **"CORONARY ANGIOGRAPHIC PROFILE IN PATIENTS WITH FAILED THROMBOLYSIS"** is the bonafide original work of **Dr. M.SARAVANAN**, in partial fulfillment of the requirements for D.M. Branch-II (CARDIOLOGY) examination of **THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY** to be held in August 2014. The period of post-graduate study and training was from August 2011 to July 2014.

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DECLARATION

I, **Dr.M.SARAVANAN,** solemnly declare that this dissertation entitled, **"Coronary angiographic profile in patients with failed thrombolysis"** is a bonafide work done by me at the department of Cardiology, Madras Medical College and Government General Hospital during the period 2011 – 2014 under the guidance and supervision of the Professor and Head of the department of Cardiology of Madras Medical College and Government General Hospital, Professor. DR.M.S.RAVI.M.D, D.M This dissertation is submitted to the Tamil Nadu Dr.M.G.R Medical University, towards partial fulfillment of requirement for the award of D.M. Degree (Branch-II) in Cardiology.

Place: SIGNATURE OF THE CANDIDATE

Date:

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CORONARY ANGIOGRAPHIC PROFILE IN PATIENTS WITH FAILED THROMBOLYSIS

CONTENTS

INTRODUCTION

INTRODUCTION

Acute myocardial infarction one of the common cause deadth and diseases disability through out the world. Despite considerable advances in the management of infarction there is a considerable space for the improvement of the outcome of the patients mainly patients of elderly, women, patients with low education and low socioeconomic status.

The main treatment protocol in the past for infarction was thrombolysis with fibrin non specific agents , subsequently with more fibrin specific agents the patency rate of the infarct artery was better ;compared to the fibrin nonspecific agent . The patency rate and the TIMI flow after thrombolysis was based the on the agent used, whether it was a fibrin specific or non specific agent. Several factors predicted the response to thrombolytic . Throughout the world 30-70% of patients with myocardial infarction , still receive thrombolysis as the initial strategy. Failure of thrombolysis in Indian scenario was seen in 30-40% of patients.(3)

The present treatment guidelines for myocardial infarction was primary percutaneous intervention. Primary percutaneous intervention is preferred especially if done by an operator who has done > 75 pci

procedures / year and team with atleast 200 pci / year including at least 36 primary pci procedure / yr. The patency rate and grade of TIMI flow was better with primary percutaneous intervention, when compared to that of the thrombolytic used. Patent artery has a better prognosis than patients with occluded vessel.(5-8)

Though primary percutaneous intervention is the first line of treatment in patients with acute myocardial infarction , it is not routinely practiced due to various factors like delay in presentation of the patients, nonavailability of the cath lab, the cost factor involved in it . so still thrombolysis remains the most common practiced treatment in patients with acute myocardial infarction. Even with the recently available thrombolytic treatment drugs the patency of the thecoronary artery was 60% (9). about one third of patients develop spontaneous recanalization of the occluded infart related artery beginning at 12-24 hrs . decrease in mortaliy is more, by the shorter time taken to reperfuse the myocardium. Time delay is more important in thrombolysis than in percutaneous intervention, because the fibronolytic is less effective as the coronary thrombi mature. Similarly every 30 minute delay in the symptom onset to percutaneous intervention increases the relative risk of 1 yrmotality by 8%. Fibrinolysis has been shown to improve both short term and long term survival.(10,11)

This study was aimedat analysis of various demographic factors associated with failed thrombolysis. The coronary angiographic profile of patients with failed thrombolysis that is the lesion characteristics , in the coronary artery. The prevalence of no reflow phenomenon in patients with thrombolysis. Is there is any variation in the response to the thrombolysis to different coronary artery lesion.

The ultimate goal of reperfusion in acute myocardial infarction is tissue perfusion, whether is due to primary coronary intervention or due to fibrinolytictherapy. This study also assess the critical lesion characterictic and stenosis in coronary artery in patients with acute myocardial infarction . In india, thromboysis remains the main mode of treatment as compared to ptca. The prognosis of patients with poor response to failed thrombolysis or percutaneous coronary intervention is poor.

AIM OF THE STUDY

AIMS AND OBJECTIVES

- To assess the demographic profile of patients with successful and failed thrombolysis .
- To access the angiographic lesion characteristic in patients with failed thrombolysis , in comparision with patients with successful thrombolysis.
- To assess any predilection of an infarct artery for successful or failed thrombolysis.
- To access the prevalence of no reflow phenomenon in patients with successful thrombolysis.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Acute myocardial infarction is occurrence of myocardial necrosis in the clinical setting of myocardial ischemia . acute myocardial infarction can be diagnosed by ecg, enzyme elevation and clinical symptom of typical angina. Myocardial infarction is a important cause of morbidity and mortality world wide .early recognition of the symptoms and prompt need for immediate treatment is mandatory to preserve the cardiac muscle. Myocardial infarction can be a first manifestation of a cardiac diseases. It may reappear in a patient with established cardiac diseases. Though it was mostly thought to be a diseases common in industrialised nation . It is a serious health issue in the developed nation and third world countries.(1).its has also now a problem in developing nation like India.(1) Myocardial infarction has an impact on the economic part and the pshological role in a patient since it affects mainly people in there active days of life. Success rate of the thrombolysis is different with the studies . success of the thrombolysis depends on the type of the lesion , the thrombolytic used the time for the presentation of the patient in the emergency. what is the need to assess the need for failure to lysis. It has been suggested that these patients who had failed lysis have more deadth and diseases rate. It also

has the role in deciding the treatment option feasible for these patients. The rate of successful thrombolysis of the coronary artery is around 30-70% in various trials.

ELECTROCARDIOGRAPHY

Acute myocardial infarction is a syndrome with features of decreased myocardial perfusion symptoms like angina or breathlessness with electrocardiographic evidence of ST segment elevation.(12)

Acute myocardial infarction is diagnosed based on the ecg criteria, new ST segment elevation at the J point in two contagious leads with cutoff points of 1mm ST elevation in leads other than v2-v3 where the cutoff point is 2mm in age >40 yrs, and 2.5mm in age <40 yrs or >1.5mm in women.Contiguous leads' refers to lead groups such as anterior leads (V1–V6), inferior leads (II, III, aVF) or lateral/apical leads (I, aVL). Supplemental leads such as V3R and V4R reflect the free wall of the right ventricle and V7–V9 the infero-basal wall.(12)

Thrombolysis is the most commonly practiced modality of treatment for reperfusion in ourindian scenario. Failure to thrombolysis can be diagnosed more commonly based on ecg criteria. Failure to

thrombolysis can also be diagnosed based on clinical symptom and enzyme markers.

REPERFUSION

Reperfusion it implies the tissue level of perfusion , which is best diagnosed by imaging techniques and by 12 lead ecg. coronary angiogram has a lesser role in the assessment of reperfusion of myocardial tissue. Patency of coronary artery, suggest there is some flow in the coronaries, whatever may be the amount

RECANALIZATION

Recanalization is not commented until the previous coronary angiogram is available which was blocked and re coronrary angiogram shows patent coronary artery. Patent artery doesn't suggest that the tissue level of perfusion is normal.

Failure to successful lysis has increased the probability of deadth and worsening of LV function (13). Ultimate role of thrombolysis is to achieve a TIMI 3 flow in the coronary artery. Best successful lysis is achieved with TIMI 3 flow. Mortality of failed lysis by ecgcriteria is about 10- 20%(14).

THROMBOLYSIS

Thrombolytics have shown to dissolve the thrombus load seen in patients with acute myocardial infarction. Decrease in the thrombus with dissolution of it have shown improve e the myocardial function. The improvement in the myocardial function may me be due to the lesser infarct size in patients who had undergone thrombolysis. Infarct size have shown to correlate well with the mortality in patients with acute myocardial infarction(22,23). Hypothesis of a open artery is the corner stone for the reperfusion therapy. As reperfusion therapy either by thrombolysis or percutaneous coronary intervention had shown to preserve the myocardium. the GISSI (GruppoItaliano per lo Studio dellaSopravvivenzanell'InfartoMiocardico) and ISIS-2 (Second International Study of Infarct Survival) trials in thrombolytic era have shown to decrease the mortality due to myocardial infarction by 30 percentage.(10)

Summary of Initial Randomized Clinical Trials for Thrombolytic Therapy in ST Elevation Myocardial Infarction Modified from Kiernan TJ, Gersh BJ: Thrombolysis in acute myocardial infarction:

Trial	No. of Sites	Agent	Dose/Duration	Enrollment Dates	Placebo/Blinding	Age Criteria (y)	Symptom Duration (hr)
GISSI-1 (*N* = 11,806)	176	SK	1.5 MU/1 hr	2/84–6/85	No	All	<24–<12
ISIS-2 (*N* = 17,187)	417	SK	1.5 MU/1 hr	3/85–12/87	Yes	All	<24
AIMS (*N* = 1258)	39	APSAC	30 U/5 min	9/85–10/87	Yes	<75	<6
ASSET (*N* = 5011)	52	tPA	100 mg/3 hr	11/86–2/88	Yes	<75	<6

Presently the gold standard and approved intial treatment of acute myocardial infarction is primary percutaneous intervention . however AHA recommends thrombolytic therapy in situation like , when the symptom is present for less than 3 hrs, when catheterisation laboratory is occupied, there is a possibility of prolonging the treatment of percutaneous intervention, there is no evidence of cardiogenic shock with any contraindication for thrombolysis. Though thrombolytic seems to be an option under certain circumstances. There are certain disadvantages with the thrombolytic therapy, ie the increase bleeding rates, partial resotoration of the lumen of the coronary artery, restenosis rate of the infarct related coronary artery are higher as in the primary percutaneous intervention group.

However, because of concerns about bleeding complications, incomplete patency, and early reocclusion rates with thrombolytic therapy, combined with the fact that more primary PCIs are safely and successfully being performed at smaller hospitals without on-site cardiac surgery back-up, thrombolytic therapy has been surpassed by primary PCI as the treatment modality for STEMI associated with better clinical outcomes.

SUCCESSFUL THROMBOLSYSIS

Criteria and protocol for suggesting a patient thrombolysis is successful is variable between the studies. Most studies which stated successful thrombolysis took ST segment resolution in the lead with maximum ST segment elevation on presentation , with greater than 50% resolution of ST segment after 60minutes of thrombolytic therapy. The resolution of ST segment is often associated with resolution of the angina. AHA guidelines suggested that the resolution of ST segment by greater than 70% compared to the ecg in the lead with maximum ST elevation as the criteria for successful reperfusion. studies has shown that decrease in the ST segment, cessation of chest pain, and occurrence of reperfusion arrhythmia are all suggestive of successful thrombolysis.(14)

Diagnosis of failed thrombolysis

- Persistant chest pain
- -ecg ST segment resolution less than 50% of the baseline
- -troponin t, CK_MB mass or myoglobin ratio post /pre thrombolysis,

<5 at 60 minutes

<10 at 90 minutes

-myocardial contrast echocardiography.

Diagnosis of failed lysisis based on the ecgcriteria ismaximum ST segment elevation before and after thrombolysis at 80ms from j point. Preferred criteria for failed thrombolysis is failure of the ST segment to decrease > 50% from the prethormbolytic stage, prerfeably at 60 min than at 90 minutes(11). failure to achieve TIMI 3 flow by Ecg criteria for failed thrombolysis has a diagnostic accuracy of 80-85% (15)

In a meta analysis of several trials the mortality with TIMI 3 flow was at 4-6 wk was 3.7% , 7% for TIMI 2 and 8.8% for TIMI 0-1(17). Studies have shown that patient with failed thrombolysis have

worse prognosis (31,32,33).Assessment of the thrombolysis is clinically unsatisfactory, so other modalities to reassess the thrombolysis status has been assessed in various studies(18,19).

CHEST PAIN

Characteristic chest pain of myocardial infarction has been termed as angina, which is usually substernally present. Angina has characteristic radiation to the arm, neck and left shoulder. The pain gradually increase in intensity. Pain of myocardial infarction is similar to angina but usually persist for more than 20 minutes .patients with risk factor like diabetes or elderly usually don't have the charactersistic angina pain. The can present with varies features , not seen with that of a typical angina. chest pain has to be differentiated from other cause of chest pain of acute onset.

Diagnosis of failed thrombolysis is not only depenedant on ecg criteria, but also ton symptomatology like resolution of chest pain.symptomatic improvement in the chest pain and return to the baseline of the ST segment and reperfusion arrthymias are seen only in 15% of the patients with acute myocardial infarction. Chest pain can persist in patient due to decrease in the tissue perfusion. Factors like pericarditis in acute myocardial infarction, diabetes mellitus, pain

threshold, analgesics all can interfere with the analysis of chest pain. Complete resolution of the chest pain was seen in only 29 percentage of patient with patent arteries. (19)There is always a need to diagnose failed thrombolysis, which has been emphasized since these patients needs an alternative modality of treatment. The diagnostic criteria for has to be simple since time is muscle.

The resolution of chest pain may be due the evolving phase of myocardial infarction or due to reperfusion of the coronary artery after thrombolysis. The differentiation between them become difficult .early rise resolution of the symptomatology is more common with reperfusion. Patient tend to have more persistant pain if these patients are in the evolved phase of myocardial infarction. Similarly with reperfusion, have earlier attainement of baseline segment, than patient who are in the evolved phase of the myocardial infarction.

Von essen eta1 in his studied stated that, more rapid resolution of ST segment in patients with reperfusion, than in evolved myocardial infarction (18).

ELECTROCARDIOGRAPHY

The criteria for successful lysis has been evaluated in various studies .some people measured the ratio of maximum ST segment elevation pre and post thrombolysis. Some studies have evaluated acriteria of the sum of ST elevation and ST depression. The most accepted criteria is the failure of the ST segment in the lead with maximum ST elevation to >50% from baseline value. The most preffered criteria was, this measurement was taken at 60 min after the onset of the thrombolysis. Continuously monitoring of the ST part of the electrocardiogram had also been assessed in studies.though ST segment monitoring suggest perfusion of the myocardim is not clearly stated.

BIOMARKERS

Release of biomarkers to diagnosis of acute myocardial infarction is not consistent . the limitation of it is that the serial measurement of biomarker are needed as the release pattern of biomarkers changes with the thrombolytic used and the time to the onset of infarction., there is delay in the availability of the blood reports. The first marker to suggest reperfusion is the rise in the peak levels of myoglobin.rate of rise of troponins 3 hr after thrombolysis has sensitivity of 94 percentage and

specificity of 100 percentage to suggest reperfusion. Some studies suggest that troponin may be useful to access reperfusion.(7)

Rapidity of increase in troponin T 3hr after lysis can be used to access successful reperfusion. There are no markers to suggest failure to achieve TIMI 3 flow at 60- 90 min (25,26).Increase in the enzyme may suggest recanalization of the infarct artery , but not reperfusion to suggest improvement in the microvascular dysfunction(27).Markers of reperfusion is less effective to diagnosis failed reperfusion in patients without ST resolution(28). Fibrinogen levels may be useful to assess whether the reperfusion is due to non fibriongenolysis than due to no reflow(27).

Arrhythmia

- Arrhythmic complication are more common in patients with failed thrombolysis (29). Most common arrhthymia in the post thrombolytic period is likely to be due to ventricular tachycardia. These patients can also develop other arrthymia like atrial fibrillation, ventricular fibrillation, supraventricular tachycardia. Reperfusion arrhythmia-arrhythmia to diagnosis of reperfusion is not very sensitive(17)

FACTOR PREDIPOSING TO FAILED THROMBOLYSIS

Failure of reperfusion many be due to many factors may be due to diffuse degree of critical narrowing of the target vessel, or may be due to microvascular no reflow. Absence of resolution of chest pain and ST segment not a very sensitive sign of failed reperfusion.(18). Multiple factors predisposing to failed thrombolysis have been hypotheises,

A) Haematological factors like

- Blood levels of fibrinogen
- Lipoproteins present in blood
- Complex of antithrombin and thrombin

B) Lesional factors like

- Pressure in the arteries before the level of thrombus
- Tension or stress on the myocardium
- Intensity of the thrombus
- Amount of blockage in the vessel after thrombolysis
- Type of lesioncharactersistics of the plaque.

TIMI FLOW

Degree of ST returning to baseline correlates with the TIMI flow grade in the vessel and the long term outcome (21,23).The best parameter for assessing the reperfusion failure with low rate of false positive in the non occluded vessel is electrocardiography(22,23,) .Though the patient may have achieved successful TIMI 3flow,the myocardial perfusion may not be normal. Patency rate in the artery with TIMI 3 flow after thrombolysis is 54 percentage. The best method to predict the success of thrombolysis is to access myocardial perfusion. Myocardial perfusion can be assessed by PET and contrast echocardiography. Pitfalls associated with these modalities of diagnosis is itscostiliear and needs expertise. TIMI flow doesn't truthfully measure the tissue perfusion.

Features of slow flow or prolonged TFC and impaired myocardial blush many correlate with epicardial flow than the vessel in the microcirculation. the myocardial perfusion is better assessed by the degree of ST segment resolution. However TIMI flow have not seen to show to correlate with the myocardial perfusion. Some studies suggested that the TIMI 3 flow is more common among smokers than

non smokers and seen in first time myocardial infarction (1) but TIMI 3 flow patient had similar risk factor like diabetes, hypertensison.

TIMI GRADING

For comparison of the flow in the coronary artery system, the grading of the TIMI flow is done , grade 0 complete occlusion grade 2 minimal entry of the contrast material, beyond stenosis without perfusion of distal coronary bed. Grade 3 normal flow. Recanalized coronary artery is stated only if previous coronary angiogram is available. If earlier angiogram is not present it will only say about the patency of the coronary artery during the angiogram. Studies to asses the TIMI flow where angiogram was done 90 min or better with 60 min after start of thrombolytic(24).

TIMI FRAME COUNT

Quantitative assessment of the briskness of the coronary blood flow(1). There is a difference in frame count for different coronary artery , which takes in toconsideration of the vessel size and length of the vessel(10). Frame count is the no of frames needed for the contrast material to reach the distal coronary bed. TIMI frame count can influence the mortality rate in acute myocardial infarction. With TIMI

frame count as the base line various factor have been shown to delay the coronary blood flow after thrombolysis, like thecoronary stenosis, size of the lumen diameter, the length of the artery distal to the stenosis, pulsatile flow and thrombus in lesion. Studies have shown that patient with inferior wall myocardial infarction have better ST segment resolution. Left anterior descending artery have lower rates of myocardial reperfusion.

RESCUE PTCA

Time to diagnosis of acute myocardial infarction is critical, the myocardial damage increase with the delay in the reperfusion. Thrombolysis trial have shown that the maximum benefit of thrombolysis is seen in patients who presented early to the hospital with time duration lesser than 3 hrs of onset of chest pain. The benefits of rescue percutaneous intervention has been questioned if the time of presentation of the patient is more than 12 hrs of chest pain

Limitations of rescue angioplasty – repefursion of the coronary artery achieved more as the time progress form the institution of thrombolytic so early treatment with rescue PTCA may not be warranted. Rescue angioplasty patients have increase use of contrast, reperfusion injury, emboli, increase in the rate of bleeding complication.

NO REFLOW PHENOMENON

- Myocardial no reflow phenomenon can occur after thrombolysis due to microvascular damage and reperfusion injury.No reflow phenomenon is more come after rescue PTCA than after primary PTCA(34,35).
- Angiographically myocardial perfusion can be graded as
- Grade 1 no perfusion of myocardium, stain on the myocardium present
- Contrast enters the micro vasculatue, but still persistant and the end of wash out phase
- Contrast is minimally persistant at the end of wash out phase.

In a study conducted bysudbhindrarao , patilbs stated that about 25-50 percentage of patient failed to achieve reperfusion. Of the 50 patients 60 percentage achieved successful repefusion. Persistant of chest pain and persitant ST segment elevation was associated with failed reperfusion. No reflow phenomenon is noted in primary PTCA and rescue PTCA. Though no reflow phenomenon noted commonly after intervention. It is also seen in pateients who are thrombolysed with fibrin specific or nonspecific agents. whether its is common in primary PTCA patients or after rescue PTCA. It is mostly noted in patients with rescue PTCA.

MATERIALS AND METHODS

MATERIALS AND METHODS

This study was conducted in Rajiv Gandhi Government general hospital in the Department of cardiology during the year 2013-2014. The involved a total of 59 patients .these patients where grouped in those with successful thrombolysis and those with failed thrombolysis. Patients who presented to the rajiv Gandhi government general hospital, who where diagnosed to have acute myocardial infarction between November 2013 and march 2014 where included in the study.

About 59 patients with acute myocardial infarction who presented to the cardiology coronay care unit, who were thrombolysed where included in the study Sample size total case of 59 patients.

STUDY GROUP SELECTION

Institutional ethics committee clearance was obtained to conduct this study in our hospital .all patients provides written informed consent in the language known to participiate in the study.

INCLUSION CRITERIA

Patients who were admitted in rajiv Gandhi government general hospital coronary care unit, who had meet the criteria for acute

myocardial infarction where included in the study. Patients who had electrocardiographic evidence of acute myocardial infarction. Patients classified in to successful thrombolysis if there was a more 50% ST segment resolution in the lead with maximum ST elevation from at the time of presentation to 60 minutes after thrombolysis compared to electrocardiogram taken, with resolution of the chest pain. Failure of thrombolysis patients where grouped as those patients who ST segment failed to show greater than 50% resolution of ST segment in the lead with the maximum ST elevation at the time of presentation with that compared to the electrocardiogram taken 60 minutes after the onset of the thrombolysis. Patient where also included in the failed thrombolysis if the patient continued to have persitant chest pain.

EXCLUSION CRITERIA

- Patient with contraindication for thrombolysis
- Patient with evolved myocardial infarction
- Patient with history of old myocardial infarction
- Patient with associated left bundle branch block with myocardial infarction.
- Patient who are dying with 60 minutes of streptokinase theraphy.

- Patients with acute myocardial infarction with chronic kidney diseases who cant undergo coronary angiogram

STUDY PROTOCOL

Patient who presented to coronary care unit with acute myocardial infarction and diagnosed based on the electrocardiographic criteria. Patient where selected after looking for the inclusion and exclusion criteria. These patients where thrombolysed with 15 lakhs units of streptokinase after ruling out any contraindications.

CLINICAL ASSESSMENT

All patients where enquired about the history , especially with regard to the onset of chest pain and time delay to the presentation to the hospital . other history regarding the risk factor for coronary artery diseases like diabetes mellitus and the duration of the diseases and whether the patient is on insulin or oral hypoglycemic agents and, history regarding hypertension and duration of treatment were taken, previous history of myocardial infarction, smoking history for the duration of smoking and no of cigarettes per day, whether they are current smokers or not and alcoholic history where enquired. Any family history of coronary artery disease or sudden cardiac deadth in the

family was enquired. Hemodynamic parameters where assessed. All patients where on continuous monitoring during the period of lysis and until the patient is in coronary care unit.

ELECTROCARDIOGRAPHIC FINDINGS

All patients had a 12 lead electrocardiography on presentation to the coronary care unit. Patient also had a repeat 12 lead electrocardiography, after 60 minutes of intiation of thrombolysis. Based on the electrocardiography patient where classified as those having anterior wall myocardial infarction if had ST segment elevation in anterior chest leads, and inferior wall infarction, if they had ST segment elevation in the inferior leads ii, iii, avF. All electrocardiography where looked for any rhythm disturbance like accelerated idioventricularrhytm, atrioventricular block etc. all patients after clinical, electrocardiographically and echocardiographically confirmation of acute myocardial infarction where given thrombolytic therapy. Before initation of thrombolytic theraphy patient was questioned for any contraindication for thrombolytic therapy. Patient received thrombolytic therapy if there whereno contraindication for receiving streptokinase. All patients under went blood investigation like complete blood picture, blood sugar, renal function parameter, total

cholesterol and triglycerides. Patients who where decided for thrombolysis, where treated with 15 lakh units of streptokinase infusion over 1 hr, with close monitoring. Post streptokinase after 60min of thrombolysis a repeat 12 lead electrocardiography was taken. Patient was classified as have successful thrombolysis if the lead which had maximum ST segment elevation on presentation , showed a greater than 50% decrease in the ST segment. The ST segment was measured at 80 msec form the J point. patient was also questioned for the time of resolution of the chest pain patient where stated to have failed the thrombolysis if the electro cardiogram after 60 min of streptokinase failed to show resolution of the ST segment more than 50% compared to the electrocardiogram taken at presentation.patient with failed reperfusion also had persistant chest pain, more than 2 hrs after thrombolysis patient who had inferior wall myocardial infarction also had a electrocardiogaram done with right side chest lead and posterior lead.

ECHOCARDIOGRAPHIC ASSESSMENT

All patients admitted in the coronary care underwent echocardiographic with EASOATE machine before thrombolysis. Echocardiographic assessment for LV function was assessed by

modified simpsons method patient was classified as normal LV function if the ejection fraction was above 55 percentage, mild LV dysfuntion if the ejection fraction was between 46-55 percentage, moderate LV dysfunction if the ejection fraction is between 30-45 percentage, severe LV dysfunction if the ejection fraction was below 30%. all patient where looked for the regional wall motion abnormalities with wall motion score index . wall motion abnormality was described as hypokinesia , akinesia , dyskinesia and aneurysmal. Wall motion score is given as

1= NORMAL

2= MILD HYPOKINESIA

3= SEVERE HYPOKINESIA

4= AKINESIA

5= DYSKINESIA

The wall score was totalled and was divided by the number of segments. More the wall motion score the greater is the LV dysfunction.

Mechanical complication of acute myocardial infarction where looked in like ventricular septal rupture, mitral regurgitation, free wall rupture with 2D echocardiography and mechanical complication. Patient with global hypokinesia , or with hypokinesia of the non infarct artery segments where not included in the study. Patient whose regional wall motion abnormalities correlates with the electrocardiographic criteria for involvement of the myocardial segments where included in the study.

CORONARY ANGIOGRAM

All patients , in the study both in the successful thrombolysis and failed thrombolysis group underwent coronary angiogram. The angiogram was done within 72 to 96 hrs of hospital admission. The coronary angioram was done by the consultant cardiologist in our department in our cath lab with TOSHIBA infinix machine. All patients where taken for coronary angiogram after taking informed consent from the patient. Pre procedure skin preparation ,inj tetanus toxoid and xylocaine test dose was given to all patients .diabetic patient who where on oral hypoglycemic agents where changed over to regular insulin as per the diabetologist advice. patients who where hemodynamically unstable where in cardiogenic shock or

hemodynamic instability where not taken up for coronary angiogram. Patient with previous contrast allergy , severe anemia, acute renal failure , acute stroke where not taken up for coronary angiogram. Coronary angiogram was done by radial or femoral route. Majority of patient underwent coronary angiogram through the femoral route. Patient who had moderate to severe LV dysfunction with positive allenstest, coronary angiogram was done by radial route. In majority of patients via the femoral route standard 6F judkins 3.5 or 4 judkins left and right catheter was used to engage the left coronary and right coronary artery respectively. If the coronary angiogram was done through the radial route 5F tiger catheter was used. optimal angiographic views where taken to assess the lesion characteristics. coronary arteries are visualized after iodine contrast injection. Coronary arterial segments are divided in to 29 segments according to the bypass angioplasty revascularization investigators. Patient where stated to have significant coronary artery diseases if the diameter stenosis is more than 50 percentage comparing to the normal vessel luminal diameter.

Left anterior descending artery supplies the major part o f the LV myocardium in right anterior oblique view, left anterior descending artery is seen coursing on the anterior surface of the heart. While in the left anterior oblique view left anterior descending artery is seen to

transeverse the course between the right and left ventricle. Diagonal artery from where it arises from the left anterior descending artery is better seen in left anterior oblique of sixty degree and cranial angulation of 40 degree. in four fifth of patient in the general population have type 3 left anterior descending artery.in one fifth of the patient the apex of the ventricular surface is supplied by the right coronary artery or the left circumflex artery, which gives rise to the posterior descending artery.The left anterior oblique with cranial tilt may show the middle portion of the left anterior descending artery better. Left anterior oblique with cranial tilt, shows the proximal , mid , distal part of the left anterior descending artery. This view also show the separation of the diagnonal branches of the left anterior descending artey and the septal branches of the left anterior descending artery.The anteroposterior view with the cranial tilt, shows the middle part of the left anterior descending coronary artery, and also the separation of the diagonal branch of coronary artery and the septal branches of coronary artery from the left anterior descending artery. Left anterior oblique with slight caudal tilt shows the proximal of the left anterior descending artery and also the proximal portion of the left circumflex coronary artery. Antero posterior view with slight caudal tilt shows the proximal left anterior descending coronary artery , which is a branch of the left

main coronary artery. Distal portion of the left anterior descending artery is better seen in the right anterior oblique view with caudal tilt.

Right coronary artery as compared to the origin of the left coronary artery is arising from somewhat a lower level than that of the left coronary artery. The main branches of the right coronary artery are the conus branch form the right coronary artery which is the first branch from the right coronary artery. The second next branch from the right coronary artery is the sino atrial nodal artery. In half of the patients the conus artery arises as a branch from the proximal part of the right coronary artery. In the other half of the patients the conus artery directly arises from the right coronary artery if the conus artery arises directly, then the Level of the origin of the direct branch of conus artery is slightly superior as compared to that of the level of arising of the right coronary artery.the next important branch of the right coronary artery is the sinonodal artery. This artery can arises form the left cirumflex coronary artery which is seen in 40 percentage of patients. sinus nodal artery is a branch of the right coronary artery in 60% of patients. The part of the right coronary artery after the origin of right ventricular branch gives rise to a many acute marginal branches. The right coronary artery divides in to posterior descending artery and the posterolateral branches.

Visualization of the ostium of RCA is best done in the left anterior oblique view, may or may not need a cranial or caudal tilt. Lateral view some time shows the origin of right coronary artery better. Right coronary artery in its proximal part are best assessed by left anterior oblique with cranial or caudal tilt. Forshortening of the proximal right coronary artery might occur in the right anterior oblique .left anterior oblique with cranial tilt and right anterior oblique , left lateral views delineates the middle part of the right coronary artery. Left anterior oblique and ap cranial view , delineates the proximal part of the posterior descending artery and its bifurcation. AP view and RAO view delineates the middle part of the posterior descending artery better.

STASTICAL ANALYSIS

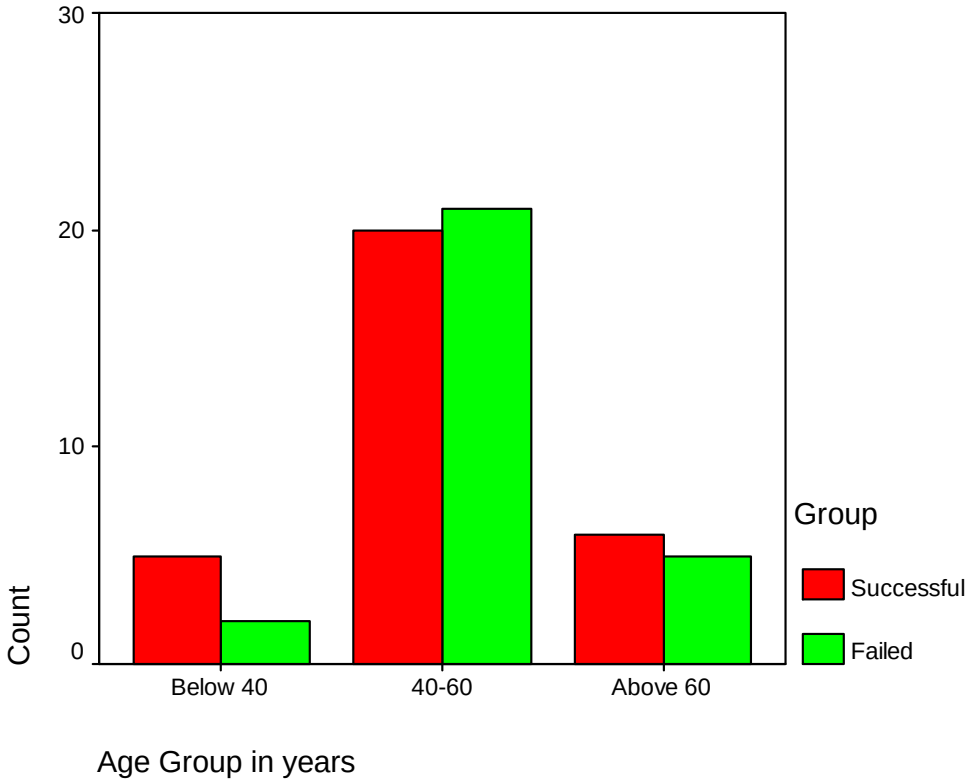
- Statistics was done with statistical package for social sciences 10.0 program.

RESULTS AND ANALYSIS

RESULTS AND DATA ANALYSIS

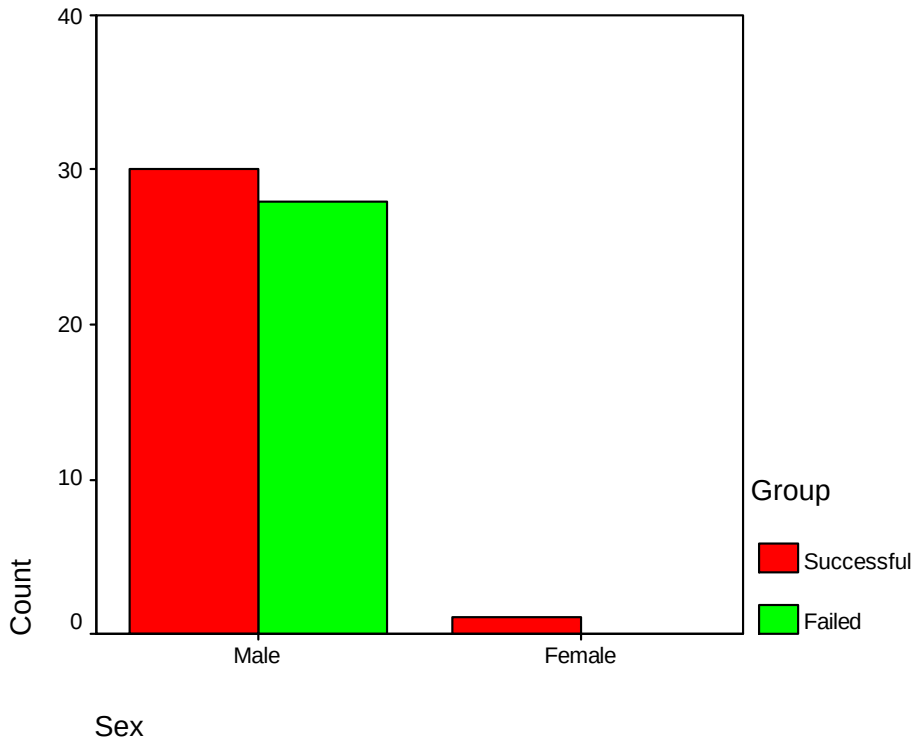
All patients in the study group was analysed statically in the study. The study group was divided in to two groups as those patients with successful and failed thrombolysis. The total number of patients selected in the study was 59 patients .the selection of the patients was based on inclusion and exclusion criteria. All patients in the study underwent thrombolysis with streptokinase of the total number 59 patients in the study group, 31 patients belonged to successful thrombolysis group and 28 patients belonged to the failed thrombolysis group. All patients in the study group were categorised based on the age, sex, the region of myocardial infarction, time to lysis, presence of diabetes mellitus, hypertension, whether patient had risk factor like smoking, alcoholism, hyperchlolestremia, ejection fraction by echocardiography. Angiographically the variables included in the study where, number of coronary artery involved, the percentage of stenosis in the artery, the lesion characterescitic of the coronary artery, whether it is a type A, B, C lesion. All patients in the study underwent coronary angiogram within a week of admission in to hospital for acute myocardial infarction.

In the 59 patients included in the study 53 % of patients where in the successful thrombolysis group and 47 % of patients where in included in the failed thrombolysis group. Patients presenting with myocardial infarction was more common in the age group between 40-60 yrs of age. There was no significant difference in the age wise variable of presentation between the failed thrombolysis and the successful thrombolysis group with the p value of (0.535). which was not statistically significant.



	Successful thrombolysis	Failed thrombolysis	
Age in yrs<4o	71.4%	28.6%	
Age in yrs 40-60	64.5%	51.2%	P value <0.535
Age > 60 yrs	54.5%	45.5%	

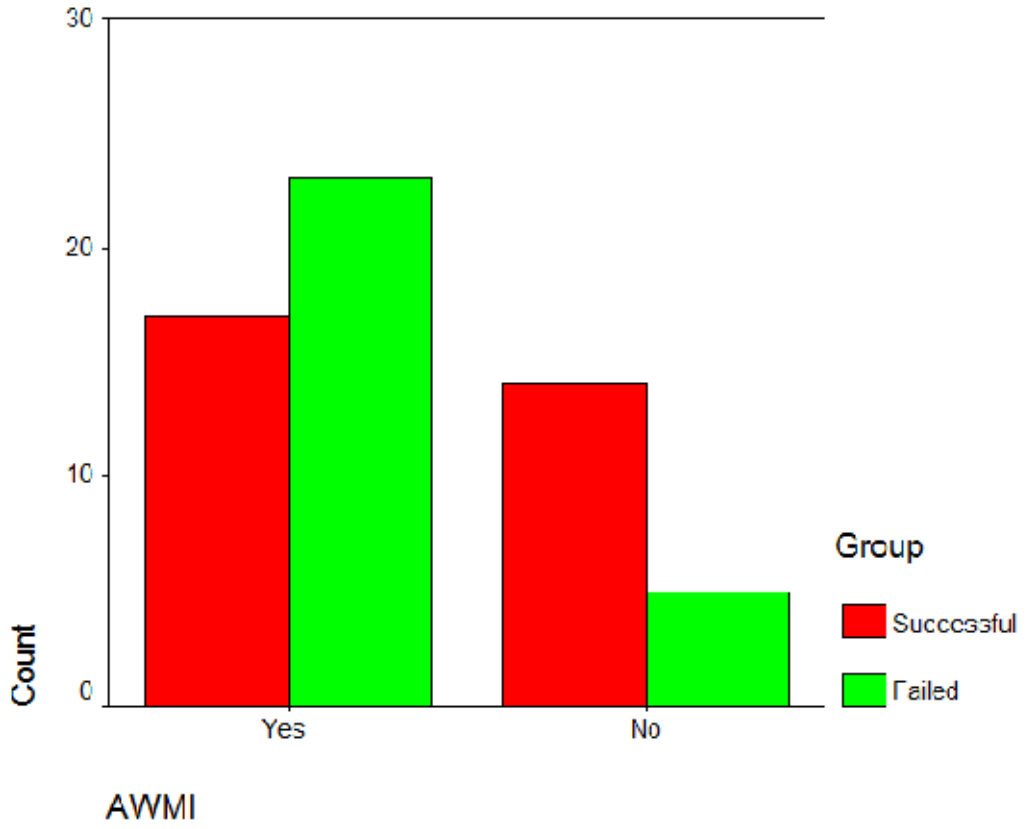
Among the total 59 patients , 58 patients where male and only one female was present in the study after analysing the data, this female patient was in successful thrombolysis group. Sex variable comparision between the successful thrombolysis and the failed thrombolysis was not statically significant with a p value of (0.338).



	Successful lysis	Failed lysis	
Male	51.7%(30)	48.3%(28)	P value <0.338
female	100%(1)	0%(0)	

With a total of 59 patients, 40 patients had an anterior wall myocardial infarction, with the remaining 19 patients had acute inferior wall myocardial infarction. In the patients within the anterior wall myocardial infarction, about 42.5% patients had successful thrombolysis and, 57.5% patients had failed thrombolysis in the anterior wall myocardial infarction group. patients with anterior myocardial infarction had more thrombolysis failure than patients with inferior wall

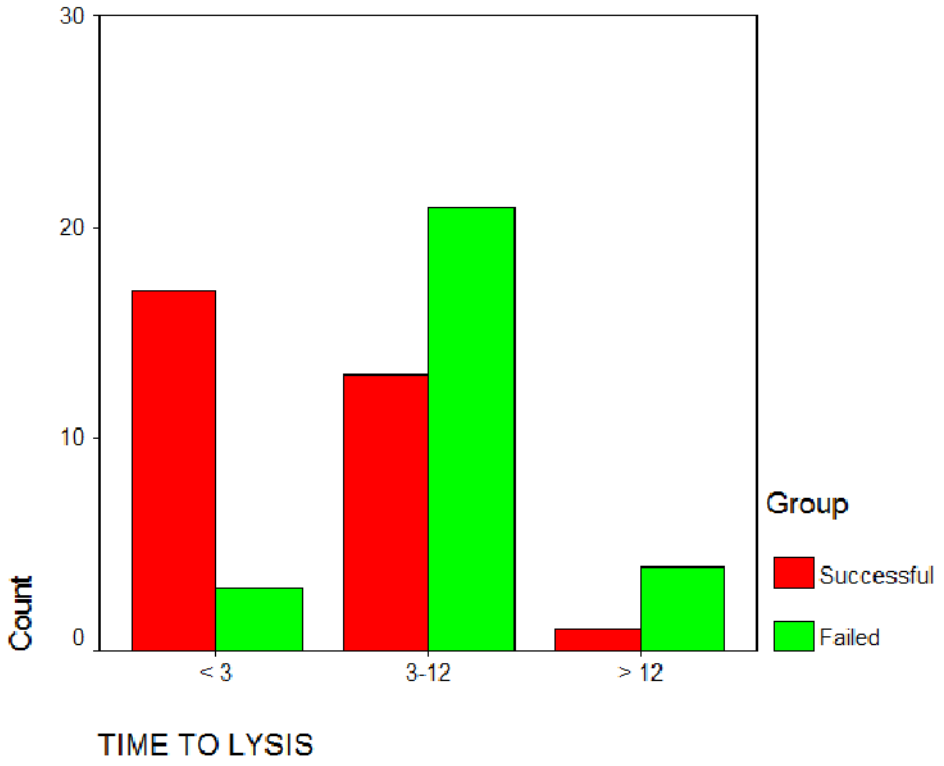
myocardial infarction which was statically significant with a p value of 0.025. among the patients with inferior wall myocardial infarction. patients who had inferior wall myocardial infarction where 19 patients, among the patients 15 patients had successful thrombolysis, while 4 patients had failed thrombolysis. In patient with inferior wall myocardial infarction , 75% of patients had successful thrombolysis, while 25 % of patients had failed thrombolysis, which was statically significant with a p value of <0.013. comparing the significance of p value, patient with inferior wall myocardial infarction where more significantly associated with successful thrombolysis than patient who had anterior wall myocardial infarction.(p<.013 vs p<.025).



	Successful thrombolysis	Failed thrombolysis	
AWMI	42.5%(17)	57.5%(23)	P value <0.025
IWMI	73.7%(14)	26.3%(5)	

	SUCCESSFUL	FAILED	
IWMI	75%(15)	25%(5)	P value <0.013
AWMI	41.0%(16)	59%(23)	

The time taken for lysis of patient on arrival to coronary care unit, was divided in to three sub division, like patient who arrived < 3hr of onset of chest pain , and those between 3-12 hrs , > 12hrs. in the total of 20 patients who arrived to hospital within < 3 hrs of chest pain 85% of patients had a successful thrombolysis while only the remaining 15% of patients had a failed thrombolysis patient who presented after 3 hrs of symptom onset where more commonly seen with failed thrombolysis . in the group of patients who presented >12 hrs after onset of chest pain ;of the 5 patients, nearly 80% of patients had a failed thrombolysis than successful thrombolysis. Those patients who presented between 3-12hrs after onset of chest pain nearly 61% of the patient had a failed thrombolysis as compared to the patients with 39% of patients with successful thrombolysis. Patient who had time to thrombolysis of less than 3 hrs had a statically significant p value of < .001.

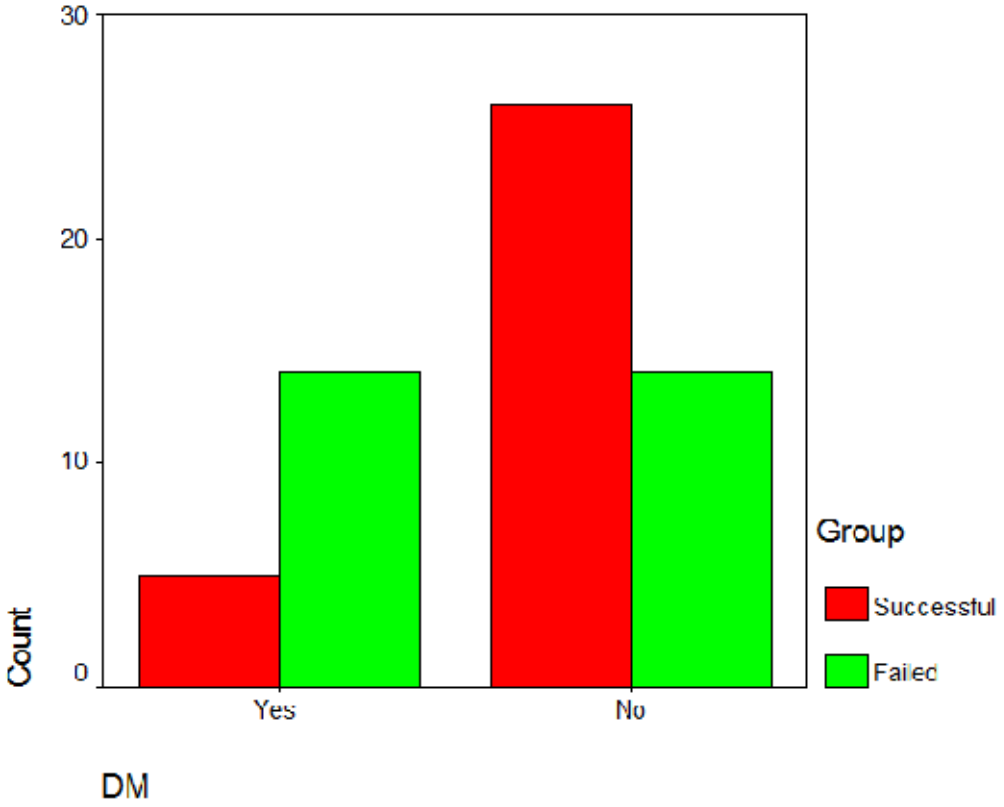


TIME TO THROMBOLYSIS	SUCCESSFUL	FAILED	
<3hrs	85%(17)	15%(3)	
3-12 hrs	38.2%(13)	61.8%(21)	P value <0.001
>12 hrs	20%(1)	80%(4)	

Relief of chestpain, after 2 hrs of thrombolysis was studied in all patients included in the study. Of the total patients 36 patients had relief of chest pain within 2hrs after the thrombolysis, 77.8% of patients in the successful group had relief of chest pain within 2 hrs of thrombolysis, but only 22.2% of patients in the failed thrombolysis

group had resolution of chest pain less than 2 hrs after thrombolysis. This difference in the relief of chest pain was statistically significant in the successful with a p value of (ooo).

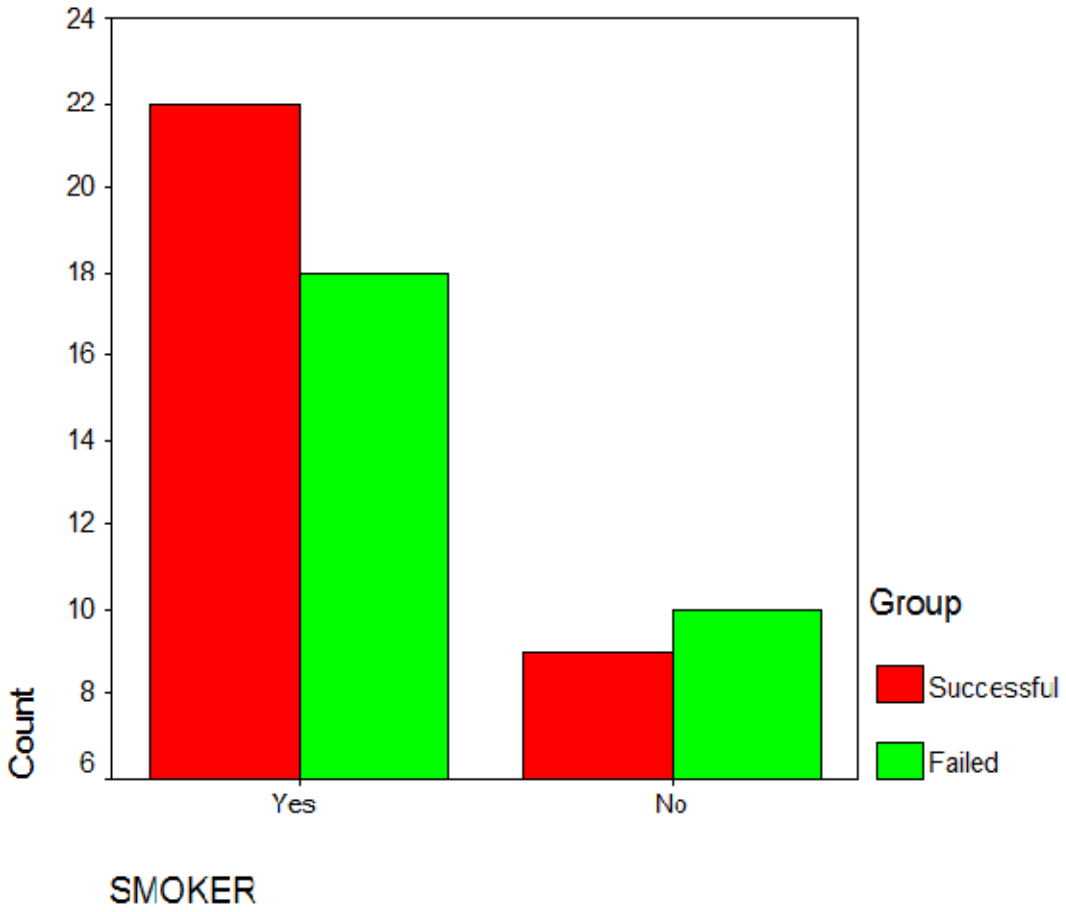
Of all the patients included in the study 19 patients had a history of diabetes mellitus, of these patients about 73.7% of patients had a failed thrombolysis as compared to the patient in the successful group of 26.3% of the study population in diabetes mellitus. Failure of thrombolysis in diabeteic population as compared to the non diabetic population was statically significant with a p value of (.005). the significance diabetes mellitus as a risk factor for failed thrombolysis is more than that of hypertension.



	Successful	Failed	
Diabetes	26.3%(5)	73.7%(14)	P value <0.005
No diabetes	65%(26)	35%(14)	

Similarly patient who had a hypertension , where analysed in both the groups , patient who had systemic hypertension in all patients was 15 patients of the 15 patients 73.3% of patients had failed thrombolysis and 26.7% had successful thrombolysis , with a pvalue of (<.020).

Smokers were found in 40 patients out of the 59 total patients , 55% of patients in the successful group where smoker and 45% of the smokers where in the failed thrombolysis group. The statistically significance among smokers in the successful and the failed lysis group was not significant with a p value of (.583) there was also significant difference in the nonsmokers group in patients with successful or failed thrombolysis.

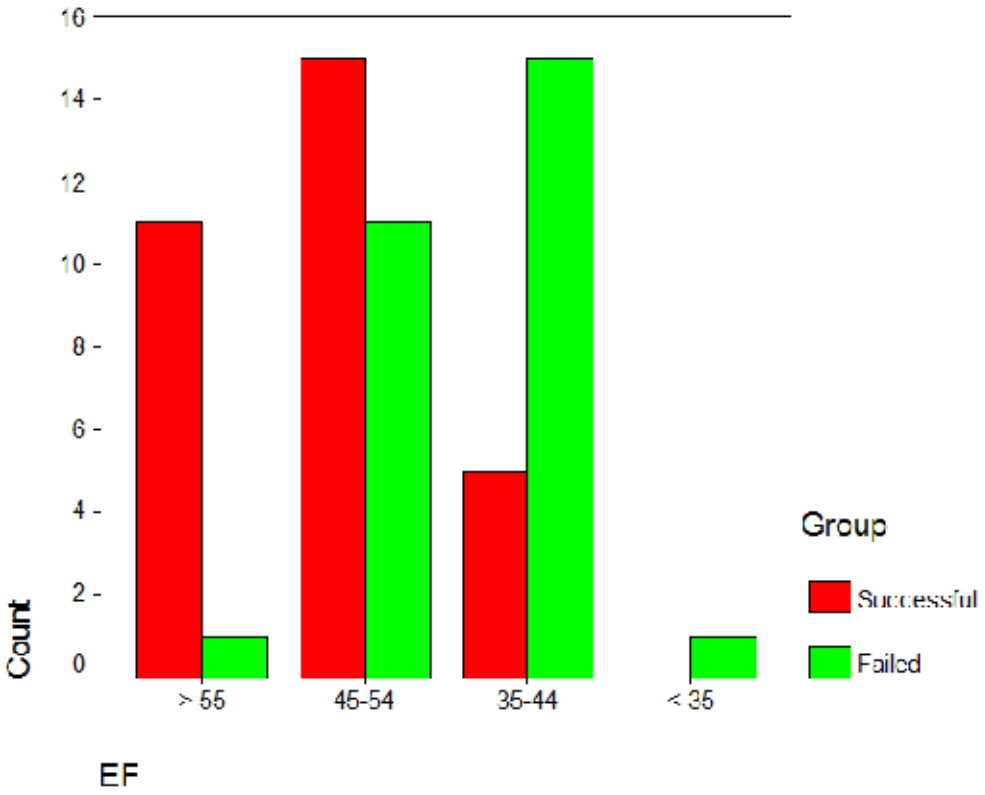


	successful	failed	
smoker	55%(22)	45%(18)	P value0.583
Non smoker	47.4%(9)	52.6%(10)	

Alcoholic patients in the total study population was about 14 patients , with 64.3% of patients where in the successful lysis group and 35.7% in the failed lysis group. In the successful group 29% of patient where alcoholics and about 17.9% in the failed lysis where alcoholics

This difference between the two groups of patients was not statistically significant with a p value of (<0.314).

All patients in the study population had a echocardiographic evaluation , patient classified as having normal LV function, mild ,moderate , severe LV dysfunction. Only 12 patients in the study population had normal LV function. 91%of patient in successful lysis group had a normal LV function, while only 8.3% of patient of the failed thrombolysis group had a failed thrombolysis. Moderate left ventricular dysfunction is more common in patient with failed thrombolysis , than patients with successful thrombolysis.patients with failed thrombolysis had left ventricular dysfunction , than patients with successful thrombolysis, which was statistically significant with a p value of <002.

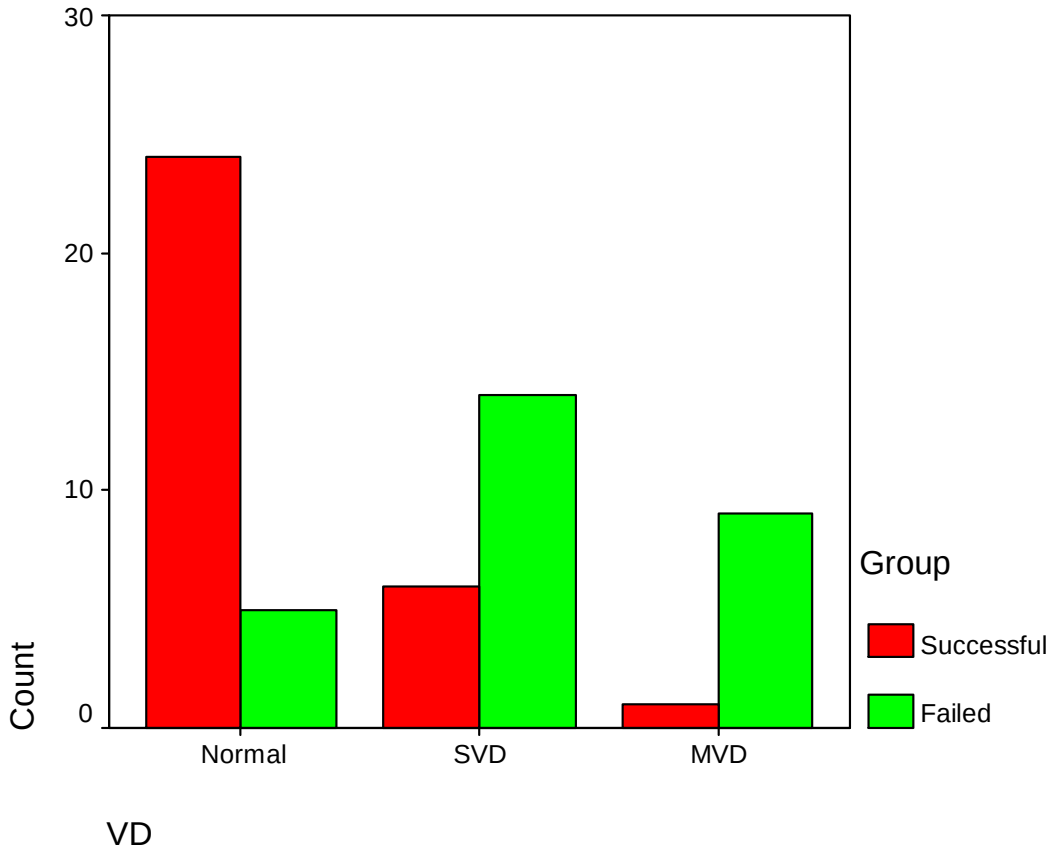


EJECTION FRACTION	SUCCESSFUL	FAILED	
>55%	91.7%(11)	8.3%(1)	
45-54%	57.7%(15)	42.3%(11)	P value <0.002
35-44%	25%(5)	75%(15)	
<35%	0%(0)	100%(1)	

Patients in the study population where divided in to single vessel , double vessel and triple vessel disesases depending on the number of coronary artery involved. The stenosis was considered significant if the

diameter stenosis was greater than 50% in the study population group 20 patients had a single vessel disease, of these 20 patients 70% of them had failed thrombolysis and 30% had a successful thrombolysis patient in the successful group only 19 % percent had a single vessel diseases, while patient in the failed lysis group about 50% had a single vessel diseases. This data was statically significant with a p value of (<.013). The study had 7 patient with double vessel diseases of which 85.7% had failed thrombolysis and 14.3% had a successful thrombolysis. In the patient group of successful thrombolysis only 3.2% had double vessel diseases, whereas the failed lysis group had 21.4% of double vessel diseases, which was statistically significant. All patient in the data with triple vessel disease belonged to the failed lysis group, none of the patients in the successful group had a triple vessel diseases. 17.9% of patient in the failed thrombolysis group had triple vessel diseases.

The statistically data was later interpreted as patient with multivessel diseases, as those with single vessel diseases. Total of 20 patients had single vessel diseases of which 30% where in the successful thrombolysis group and 70% in the failed thrombolysis group. Patient who had multivessel diseases include about 10 patients of which 90% where in the failed thrombolysis group and 10% in the successful thrombolysis group.



	successful	failed	
SINGLE VESSEL DISEASES	30%(6)	70%(14)	P value 0<.000
MULTIVESSEL DISEASES	10%(1)	90%(9)	

Hypercholestroemia is a risk factor for coronary artery diseases, mean total cholesterol in patients with successful thromboysis was 144.58 and that of patients with failed thrombolysis was 177.68 which was statically significant.

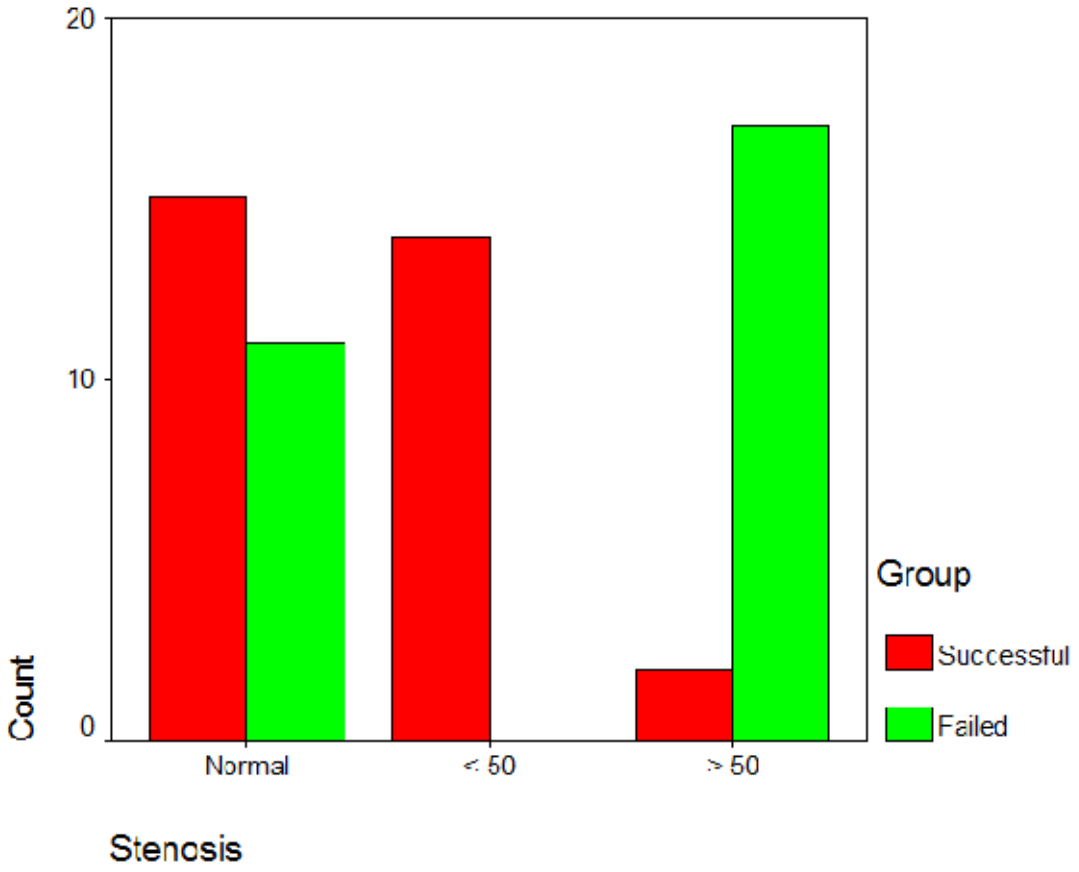
TIMI flow grading in the each coronary artery was compared in both successful and failed thrombolysis group with variables as TIMI 3 flow and those with TIMI <3 flow . in the study population of assessment of TIMI flow in the LAD territory, total of 27 patients had a TIMI 3 flow in the coronary artery with 85.2% in the successful thrombolysis group as compared to the failure of thrombolysis which had about 14.3% patients. Patient who had less than 3 TIMI flow where a total of 32 patients and it was more common in patients with failed thrombolysis in about 75% of patient, and in the successful thrombolysis group it was seen in 25 of patient. In the successful group only 25.8% had TIMI flow < 3 as compared to the patient with failed thrombolysis who had 85.7% which was statically significant with a p value of >.000. Similarly the TIMI flow in the right coronary artery was assessed and patient who had a TIMI flow of 3 in the right coronary artery was 43 patients ,with 62.8% in the patients with successful lysis and 37.2% in the failed lysis group. Among the patient in the successful thrombolysis group 62.8%had TIMI 3 flow while only 37.2% in the failed lysis had a TIMI 3 flow with a p value of <.010. similarly patient with successful lysis had 58% TIMI 3 flow, as compared to the patient group of failed lysis which had 42% TIMI 3 flow, which was statistically significant with a p value of <.048. TIMI 3 Flow after

successful thrombolysis was stastically more significant in left anterior descending artery than in the right coronary artery.

Percentage stenosis

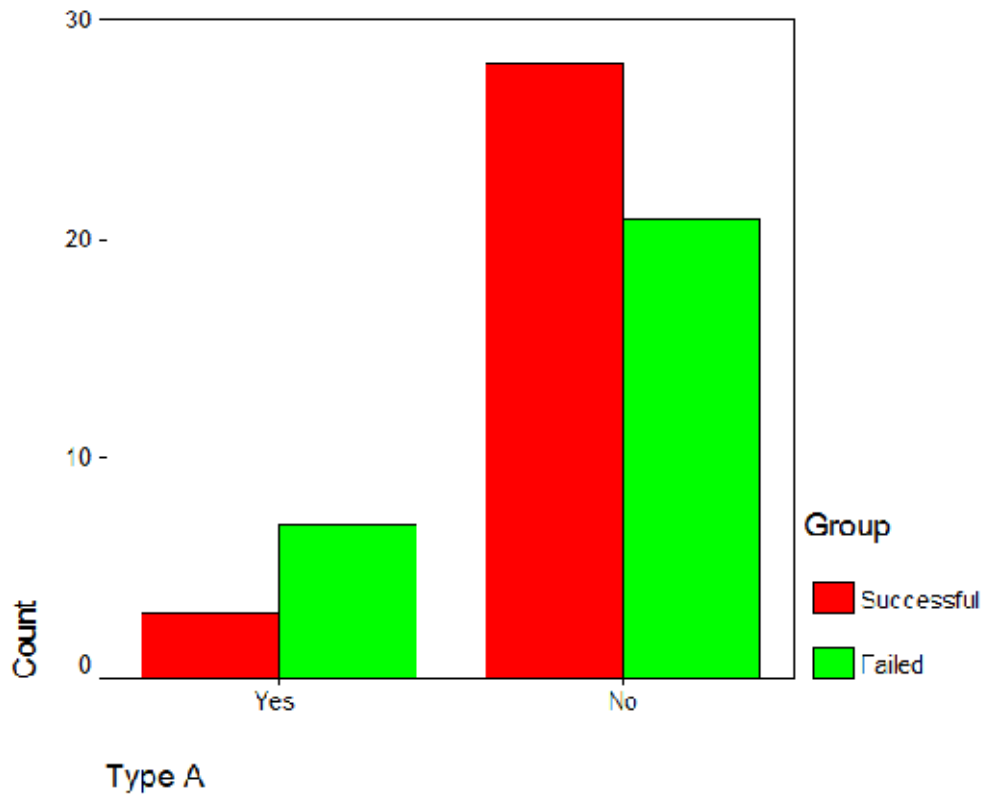
The study population was divided in to patients with significant coronary artery diseases and patients without significant coronary artery diseases (>50%) of the total no of patients about 26 patients had normal coronary artery. The remaining 33 patients about 14 patients had a stenosis of < 50 percentage stenosis and 19 patients had a percentage stenosis of > 50% stenosis. In the patients with less than 50% stenosis about 48.4% of patients belonged to the successful thrombolysis group , as compared to 42.3% patients in the failed thrombolysis group.

In the group with > 50% stenosis nearly 89.5% of patients had failed thrombolysis as compared to 10.5% had successful thrombolysis .which was stastically significant with a p value of 0.000



LESION CHARACTERISITCS

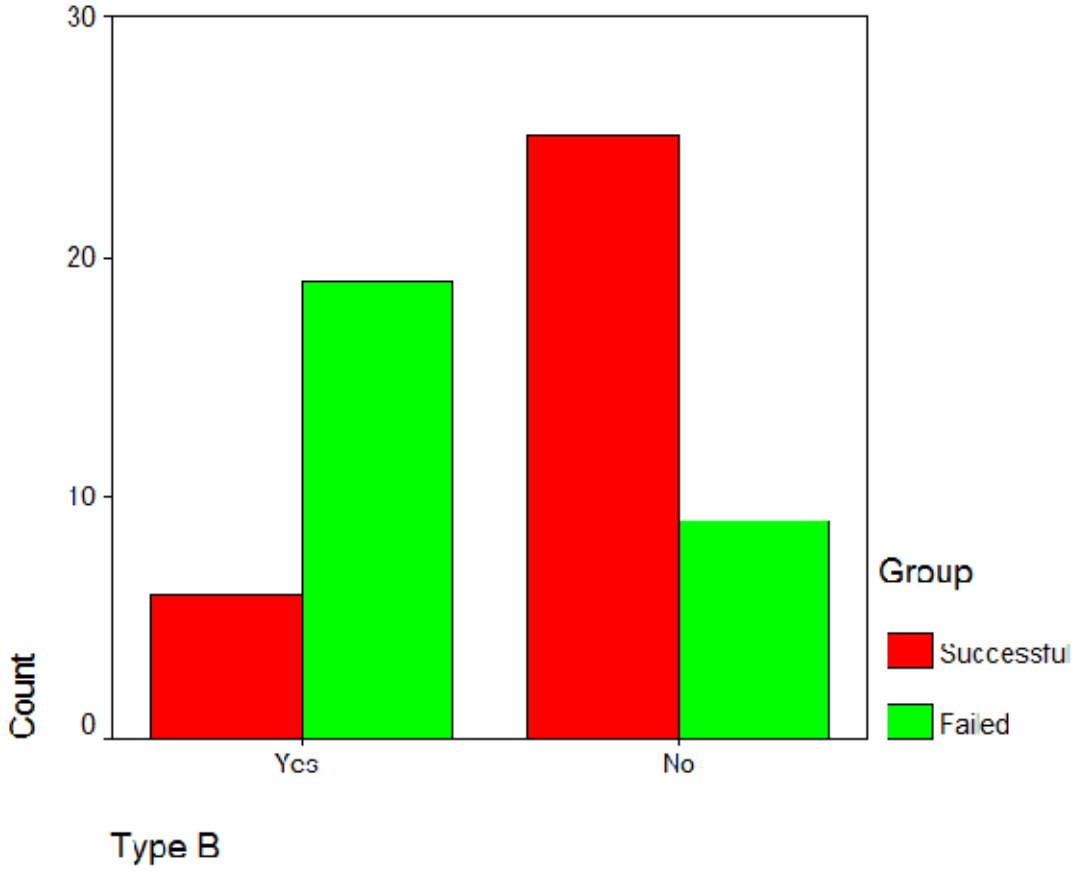
Of the total patient only 10 patient had type A coronary artery lesion, type A lesionwhere more common in failed thrombolysis patients (70%) , and in only 30% of successful thrombolysis.patients in the successful thrombolysis group 9.7% had type A lesion as compared to 25% patients in the failed thrombolysis group which was stastically not significant with a p value of <.117 .



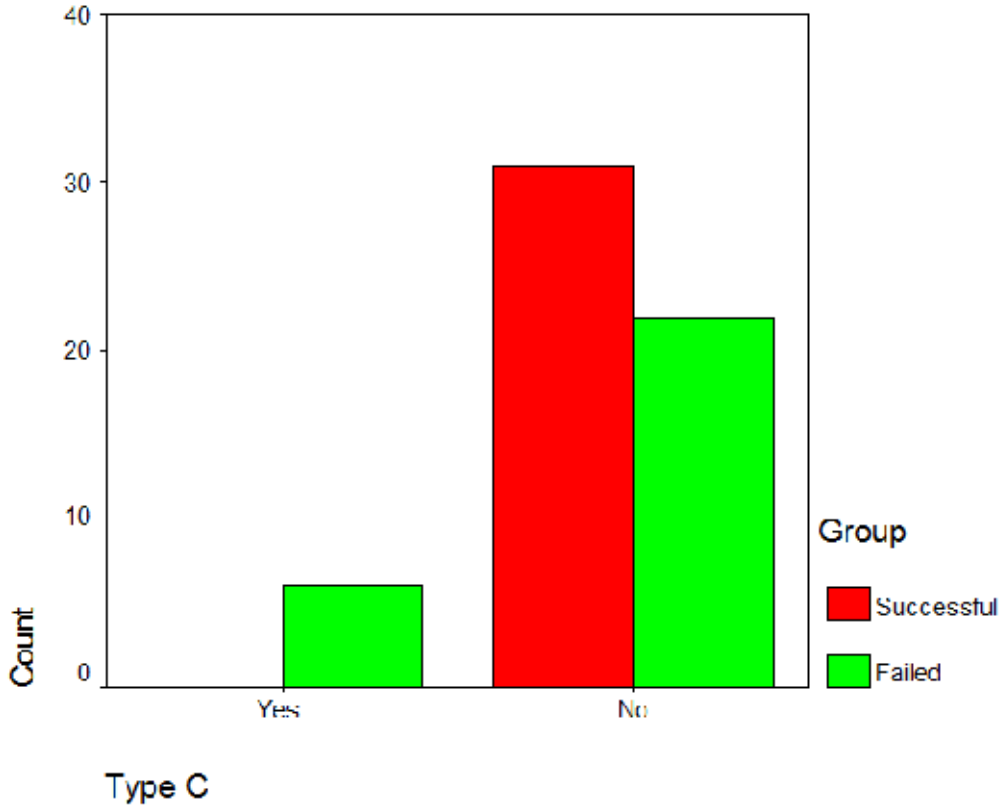
Type A lesion	successful	failed	
Yes	30%(3)	70%(7)	P value,0.117
no	57.1%(28)	42.9%(21)	

Patient who had type B lesion where 25 patients out of the 59 patients , 76% of type B lesion where found in the failed lysis group and 24% of type B lesion where found in the successful lysis group. In the successful thrombolysis patients type Bleion are seen in 19.4% and in 67.9% in the failed thrombolysis group which was statistically significant. With a p value of <.000.

TYPE B	SUCCESSFUL	FAILED	
YES	24%(6)	76%(19)	P value of <0.000
NO	73.5%(25)	26.5%(9)	



The total number of patients who had type C lesion was 6 patients, all the patients belonged to the failed thrombolysis group. Which was stastically significant with a p value of <0.007



TYPE C	SUCCESSFUL	FAILED	
YES	0%(0)	100%(6)	P value of <0.007
NO	58.5%(31)	41.5%(22)	

Among the total patient in the successful lysis group the comparison was made whether successful thrombolysis is more common in LAD , RCA, LCX. 26 patients in the LAD group patients only 15.4% had successful thrombolysis. In failed thrombolysis of the left coronary artery was more common and seen in 78.6% of patients .

NO REFLOW PHENOMENON

- In the total study population, no reflow phenomenon was see only in the failed thrombolysis group. Out of the 28 patients , 2 patients had no reflow phenomenon. These patients had a normal epicardial coronary artery, however the ST segment persistently elevated. In this study population, no reflow phenomenon was seen in 5% of the patients. Both these patients had anterior wall myocardial infarction both these patients had hypertension as a common risk factor.

DISCUSSION

DISCUSSION

In this study population of 59 patients, based on electrocardiography patients where divided in to successful group and the failure of thrombolysis group .52.5% of patients had successful thrombolysis group and only 47.5% had failure to thrombolysis.the percentage of patients who had failed thrombolysis where more common in anterior wall myocardial infarction than in inferior wall myocardial infarction which was stastically significant. Patients who had inferior wall myocardial infarction were more like to have successful thrombolysis based on electrocardiography than patients with failed thrombolysis.

The incidence of failed thrombolysis varies between different studies, but roughly it ranges from 25-45 percentage.

Katyal et al in his analysis showed the patients who showed failed, thrombolysis where about 34 percentage. (3) Our study showed a incidence of 47% for failed thrombolysis. Subindraetal in his statically data on patients with failed lysis showed that 40% had failed thrombolysis. (38)

The study conducted by Richardson SGetal showed about 44% incidence of failed thrombolysis.(39) The variation in the incidence between the studies was probably due to baseline rule involved in the diagnosis of failed thrombolysis, the thrombolytic drug used.

Sutton etal analysed the patient with failed thrombolysis was present in 40 percentage of patients in his study.

Diabetes patients in this study had more number of failed thrombolysis, than patients with successful thorombolysis. In our study, 73.7 percentage of the diabetic population had failed thrombolysis while only 26 percentage in the successful thrombolysis where diabetic which was statsically significant. In the study done by sudhindrarao 20 percentage of diabetic population had failed thrombolysis as compared to the patients with successful thrombolysis only 13 percentage had diabetes mellitus. Though this was not statically significant in his study.(38)

Samir M. Rafla, et al., in his studied of patients in comparison of diabetic vsnondiabetic, patient with in the diabetic group was seen in 18% of patients and patients in the non diabetic group about 62.5% showed significant resolution of the ST segment, which was stastically significant.(40)

In the GISSI -2 trial , death rate within the hospital in patients with diabetes mellitus was modest and ther e was no difference between the type 1 and type 2 diabetic patientsdiabetes (8.7 percentage and 10.1 percentage respectively, vs. 5.8 percentage in nondiabetic patients) . In female deadth rate is more in females with type 1 diabetes mellitus and slight modest in patients with type 2 diabetes mellitus (24.0 percentage and 15. percentage, respectively, vs. 13.9 percentage for nondiabetic patients).

The increase in in-hospital mortality of diabetic patients was moderate and similar for men with insulin- and noninsulin-dependent; in women, mortality was markedly higher for insulin-dependent and only slightly higher for noninsulin-dependent diabetic patients.

Hypertension another common association in heart disesases, subindrawdetal in his study showed that 20 percentage of patients in the failed thrombolysis group had hypertension , but only 16 percentage in the successful group which was not stastically significant (38). In this study about eleven patients in the failed lysis group had hypertension which constitutes to about 39.3% in the failed lysis group as compared with the successful group which has only 12.9% of patients .

Lee et al in his study showed, in his study population about 37 percentage of patients had hypertension, in which nearly 66 percentage of patients in had failure of thrombolysis. The hypothesis for decrease success rate in these patients is due to the endothelial abnormality associated in these patients.(36)

Time to thrombolysis , also contribute to thrombolysis failure .Lee Y Y et al patients who were thrombolysed after 6 hrs after onset of chest pain, 70% percentage patients had failure to thrombolytics. also stated that for each 60 sec delay in the thrombolysis time form symptom onset, the failure to thrombolysis was more by 10 percentage.(36)

The GISSI -2 trial showed that patient who presented to the hospital less than 6 hrs of onset of chest pain had a better prognosis than patient who presented late to the emergency . subindraetal in his study showed time for door to needle time was more(5.85±2.47 hrs) in failed thrombolysis patients while it was only (4.55±2.4 hrs).in the successful group.

In our study 85% of patients who presented to the coronary care unit less than 3 hrs after onset of symptoms had successful thrombolysis , but only 20 percentage of patients who presented to ccu after 12hrs of

chest pain had a successful thrombolysis which was stastically significant.

ANGIOGRAM OF A PATIENT WITH FAILED THROMBOLYSIS

ANGIOGRAM OF A PATIENT WITH SUCCESSFUL THROMBOLYSIS

Smoking is another important risk factor in acute myocardial infarction.

Angiographic data of GUSTO 1 showed a higher TIMI flow in the patients who were smokers as compared to that of the non smokers(41% vs. 33%, p 5 0.02).in the TEAM -, study population patients who were smokers had a better possibility of TIMI 3 flow, which not related to infarcted artery. The pausible mechanism is due to increased thrombus in smokers, while the non smokers have more

possibility of atherosclerotic diseases. In our study more number of patients where smokers in the successful thormobolysis group as compared to the failed lysis group however it was not stastically significant in our study.

Studies comparing the significance of thrombolysis have compared in various studies. The gusto study had decrease in the deadth rate in patient with anterior myocardial infraction.

Lee et al, in his study showed that anterior wall myocardial infarction was associated with less successful thrombolysis.(36) In our study also patient with inferior wall myocardial infarction had better resolution of the ST segment than patient with anterior wall myocardial infarction.

TIMI flow of grade 3 there is important for successful thrombolysis sutttonetal in his showed that patient had mortality benefit only if they achieved a TIMI 3 flow , there was no significant decrease in the deadth rate in patients who had TIMI 2 OR 1 flow in the coronary artery.

Gusto trial, suggested that the successful lysis of the patients is based on the TIMI flow after thrombolysis.(4)

Jeffrey et al in the TEAM -3 study , showed that these patients have more ejection fraction and lesser deadth rate.(37) In our study the patient who had successful thrombolysis had better TIMI flow than patients with failed thrombolysis.

CONCLUSION

CONCLUSION

- In the study population the prevalance of successful thrombolysis was 53% and the prevalence of failed thrombolysis was 47%.

- Failed thrombolysis was more common in patients who had diabetes and hypertension as risk factor. Though smokers and alcoholic where more common in the successful group, it was not statistically significant for contributing to failed thrombolysis

- type B coronary lesion angiographically was more common in failed lysis group.

- The prevalence of no reflow phenomenon in the failed thrombolysis patient in this study was 5%

- 29% of patients with persistant STelevation where symptom free after thrombolysis.

LIMITATIONS

LIMITATIONS OF THE STUDY

- Study population was small
- Not a randomized study
- ST segments is dynamic, so faults can occur in diagnosis of thrombolysis

APPENDIX

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ACRONYMS

RV	-	RIGHT VENTRICLE
LV	-	LEFT VENTRICLE
LAD	-	LEFT ANTERIOR DESCENDING ARTERY
RCA	-	RIGHT CORONARY ARTERY
LCX	-	LEFT CIRCUMFLEX ARTERY
PTCA	-	PERCUTANEOUS TRANSLUMINAL CORONARY A NGIOPLASTY
EF	-	EJECTION FRACTION
TIMI	-	THROMBOLYSIS IN MYOCARDIAL INFARCTION
EF	-	EJECTION FRACTION
RAO	-	RIGHT ANTERIOR OBLIQUE
LAO	-	LEFT ANTERIOR OBLIQUE
AP	-	ANTEROPOSTERIOR

PROFORMA

CORONARY ANGIOGRAPHICPROFILE IN FAILED THROMBOLYSIS

NAME AGE SEX HGT

WGT

DIAGNOSIS

ADDRESS

DEMOGRAPHIC AND OTHER BASELINE CHARACTERISTIC

	SUCCESSFUL THROMBOLYSIS		**FAILED THROMBOLYSIS**		**P VALUE**
	NO	%	NO	%	
AGE					
FEMALES					
DIABETES MELLLITUS					
HYPERTENSION					
SMOKER					
HYPERCHOLESTRELEMIA					

TIME TO THROMBOLYSIS FROM ONSET OF SYMPTOMS

	SUCCESSFUL THROMBOLYSIS		FAILED THROMBOLYSIS		P VALUE
	NO	%	NO	%	
THROMBOLYSIS < 3HRS					
THROMBOLYSIS 3- 12 HRS					
Thrombolysis >12-24 hrs					
MEAN TIME TO THROMBOLYSIS					

RESOLUTION OF CHEST PAIN

	SUCCESSFUL THROMBOLYSIS		FAILED THROMBOLYSIS		P VALUE
	NO	%	NO	%	
RESOLUTION OF CHEST PAIN < 2 HRS					
RESOLUTION OF CHEST PAIN> 2 HRS					
MEAN TIME FOR RESOLUTION OF CHEST PAIN					

MYOCARDIAL SEGMENTS INVOLVED

	SUCCESSFUL THROMBOLYSIS		FAILED THROMBOLYSIS		P VALUE
	NO	%	NO	%	
ANTERIOR WALL MYOCARDIAL INFARCTION					
INFERIOR WALL MYOCARDIAL INFARCTION					

EJECTION FRACTION

	SUCCESSFUL THROMBOLYSIS	FAILED THROMBOLYSIS	P VALUE
EF >55%			
54-45%			
44-35%			
<35%			

PATTERN OF CORONARY ARTERY INVOLVED

	SUCCESSFUL THROMBOLYSIS	FAILED THROMBOLYSIS	P VALUE
LAD			
RCA			
LCX			
LEFT MAIN			

PERCENTAGE STENOSIS

	SUCCESSFUL THROMBOLYSIS	FAILED THROMBOLYSIS	P VALUE
<50% STENOSIS			
50- 70% STENOSIS			
>70% STENOSIS			

LESION CHARACTERISTICS

	SUCCESSFUL THROMBOLYSIS	FAILED THROMBOLYSIS	P VALUE
TYPE A			
TYPE B			
TYPE C			

TIMI FLOW

TIMI FLOW	SUCCESSFUL THROMBOLYSIS	FAILED THROMBOLYSIS	P VALUE
0			
1			
2			
3			

MASTER CHART

NAME	AGE	SEX	AWMI	IWMI	TIME TO LYSIS	CHEST PAIN RELIEF	DM	HT	SMOKER	ALCOHOL	T.C	TGL	EF	SVD	DVD	TVD	<50	50-75	>75-95	TOTAL OCCLUSION
VENKATESAN	40	M	Y	N	1	1	N	N	N	N	146	1O2	3	N	N	N	N	N	N	N
vijaya	42	F	Y	N	2	1	N	N	N	N	122	90	2	N	N	N	YL	N	N	N
kannan	42	M	Y	N	1	1	N	N	Y	N	126	94	2	Y	N	N	N	N	YL	N
KULASEKARAN	63	M	N	Y	1	1	N	N	Y	Y	142	110	1	N	Y	N	N	N	YL,YR	N
SUNDARESAN	60	M	N	Y	2	2	N	N	N	N	152	124	1	Y	N	N	N	YR	N	N
ABDULLAH	63	M	N	Y	1	1	Y	N	N	N	142	110	1	N	N	N	YX	N	N	N
MOHAN	55	M	N	Y	2	1	N	N	N	N	144	124	1	Y	N	N	YL	N	Y	N
PANNERSELVAM	59	M	N	Y	1	1	N	N	Y	Y	124	96	2	Y	N	N	YX	YR	N	N
JAGANATHAN	40	M	Y	Y	1	1	Y	N	N	N	136	122	2	N	N	N	N	N	N	N
PAZHAMALAI	63	M	y	N	1	1	N	Y	Y	Y	148	102	2	N	N	N	YX	N	N	N
CHANDRASEKAR	38	M	N	Y	2	1	N	N	Y	Y	124	96	2	N	N	N	YR	N	N	N
CHANDRU	48	M	Y	N	2	1	N	N	Y	N	138	112	3	N	N	N	N	N	N	N
CHINNADURAI	43	M	Y	N	2	2	N	N	Y	N	164	126	2	N	N	N	YL	N	N	N
GNANAPRAKASAM	70	M	N	Y	2	1	Y	Y	Y	N	138	102	1	N	N	N	YR	N	N	N
PONNUSWAMY	65	M	N	Y	2	1	N	N	N	N	160	134	1	Y	N	N	N	N	YR	N
MOORTHY	45	M	Y	N	1	1	N	Y	Y	N	136	120	2	N	N	N	N	N	N	N
HAJAMOIDEEN	60	M	N	Y	1	1	N	N	Y	Y	124	95	1	N	N	N	YR	N	N	N
SUBRAMANI	42	M	Y	N	3	1	N	N	Y	Y	144	90	1	N	N	N	N	N	N	N
SHANKAR	37	M	N	Y	1	1	N	N	Y	Y	138	110	2	N	N	N	N	N	N	N
PRABHU	45	M	N	Y	2	1	N	N	Y	N	148	112	1	N	N	N	N	N	N	N
HABIB MOHAMMED	50	M	Y	N	1	1	N	N	Y	Y	168	118	2	N	N	N	YL	N	N	N
RAJA	44	M	Y	N	2	1	N	N	N	N	178	134	2	N	N	N	N	N	N	N
JOHNSON	44	M	Y	N	1	1	N	N	Y	N	146	112	3	N	N	N	YL	N	N	N
JAYACHANDRAN	32	M	N	Y	1	1	N	N	Y	N	188	140	3	Y	N	N	N	YL	N	N
VARDHARAJAN	32	M	Y	N	2	1	N	N	Y	N	136	102	3	N	N	N	N	N	N	N
LOGANATHAN	50	M	Y	N	2	1	Y	N	Y	N	122	84	2	N	N	N	YL	N	N	N
PRABHAKARAN	34	M	Y	N	2	1	N	N	Y	N	138	94	2	N	N	N	N	N	N	N
GOPAL	43	M	Y	N	1	1	N	N	Y	Y	138	104	2	N	N	N	YL	N	N	N
HAROON SIDDI	66	M	N	Y	1	1	Y	Y	Y	N	164	104	1	N	N	N	N	N	N	N
VIYAPURI	51	M	N	Y	1	1	N	N	Y	N	164	130	1	N	N	N	YR	N	N	N
BHAKTAVACHALAM	60	M	Y	N	1	2	N	N	N	N	144	112	2	N	N	N	YR	N	N	N

NAME	LAD TYPEA	LAD TYPEB	LAD TYPEC	RCA TYPEA	RCA TYPEB	RCA TYPEC	LCX TYPE A	LCX TYPEB	LCX TYPE C	LEFT MAIN	TIMI FLOW	TL	TR	TX	DOMINANCE	NO REFLOW	TIMI IN IRA
VENKATESAN	N	N	N	N	N	N	N	N	N	N	3	3	3	3	1	N	3
vijaya	N	N	N	N	N	N	N	N	N	N	TL2	2	3	3	1	Y	2
kannan	Y	N	N	N	N	N	N	N	N	N	TL2	2	3	3	1	N	2
KULASEKARAN	N	Y	N	N	Y	N	N	N	N	N	TL2,TR2	2	2	3	3	N	2
SUNDARESAN	N	N	N	N	Y	N	N	N	N	N	TR2	3	2	3	1	N	2
ABDULLAH	N	N	N	N	N	N	N	N	N	N	3	3	3	3	1	N	3
MOHAN	N	Y	N	N	N	N	N	N	N	N	TL2	2	3	3	1	N	2
PANNERSELVAM	N	N	N	N	Y	N	N	N	N	N	3	3	3	3	1	N	3
JAGANATHAN	N	N	N	N	N	N	N	N	N	N	3	3	3	3	1	N	3
PAZHAMALAI	N	N	N	N	N	N	N	N	N	N	3	3	3	3	1	N	3
CHANDRASEKAR	N	N	N	N	N	N	N	N	N	N	TX2	3	3	2	2	Y	2
CHANDRU	N	N	N	N	N	N	N	N	N	N	3	3	3	3	1	N	3
CHINNADURAI	N	Y	N	N	N	N	N	N	N	N	3	3	3	3	1	N	3
GNANAPRAKASAM	N	N	N	N	Y	N	N	N	N	N	3	3	3	3	1	N	3
PONNUSWAMY	N	N	N	Y	N	N	N	N	N	N	TR2	3	2	3	1	N	2
MOORTHY	N	N	N	N	N	N	N	N	N	N	3	3	3	3	1	N	3
HAJAMOIDEEN	N	N	N	N	N	N	N	N	N	N	3	3	3	3	1	Y	3
SUBRAMANI	N	N	N	N	N	N	N	N	N	N	TL2	2	3	3	2	Y	2
SHANKAR	N	N	N	N	N	N	N	N	N	N	3	3	3	3	1	N	3
PRABHU	N	N	N	N	N	N	N	N	N	N	3	3	3	3	1	N	3
HABIB MOHAMMED	N	N	N	N	N	N	N	N	N	N	TL2	2	3	3	1	Y	2
RAJA	N	N	N	N	N	N	N	N	N	N	3	3	3	3	1	N	3
JOHNSON	N	N	N	N	N	N	N	N	N	N	3	3	3	3	1	N	3
JAYACHANDRAN	N	N	N	N	N	N	Y	N	N	N	TX2,TR2	3	2	2	1	N	2
VARDHARAJAN	N	N	N	N	N	N	N	N	N	N	3	3	3	3	1	N	3
LOGANATHAN	N	N	N	N	N	N	N	N	N	N	3	3	3	3	1	N	3
PRABHAKARAN	N	N	N	N	N	N	N	N	N	N	TL2	2	3	3	1	Y	2
GOPAL	N	N	N	N	N	N	N	N	N	N	3	3	3	3	1	N	3
HAROON SIDDI	N	N	N	N	N	N	N	N	N	N	3	3	3	3	1	N	3
VIYAPURI	N	N	N	N	N	N	N	N	N	N	3	3	3	3	1	N	3
BHAKTAVACHALAM	N	N	N	N	N	N	N	N	N	N	TL2	2	3	3	1	Y	2

MASTER CHART

NAME	AGE	SEX	AWMI	IWMI	TIME TO LYSIS	CHEST PAIN RELIEF	DM	HT	SMOKER	ALCOHOL	T.C	TGL	EF	SVD	DVD	TVD	<50	50-75	>75-95
SUBRAMANI	40	M	Y	N	2	1	N	Y	N	N	194	156	4	N	N	N	N	N	N
SIVASHANMUGAM	52	M	Y	N	3	2	N	N	N	N	206	182	2	Y	N	N	N	YL	N
KRISHNAN	68	M	Y	N	1	2	Y	Y	N	N	144	140	3	N	N	Y	N	YR	YL YX
GOVINDARAJ	60	M	N	Y	1	2	N	N	Y	N	210	162	2	Y	N	N	N	YR	N
SHANKAR	52	M	Y	N	2	2	N	N	Y	Y	184	152	2	N	Y	N	Y	YL YX	N
RAJENDRAN	60	M	Y	N	1	1	N	Y	Y	N	176	130	3	N	Y	N	N	YR	YL
GANESAN	43	M	Y	N	2	2	Y	Y	N	N	201	164	3	Y	N	N	N	N	Y
JAWARILAL	61	M	Y	N	2	1	N	N	N	N	179	112	2	Y	N	N	N	YR	N
ANANDAN	52	M	N	Y	2	2	Y	Y	Y	N	129	79	3	N	N	Y	N	YX YR	YL
PERMAL	63	M	y	N	2	2	N	N	Y	Y	224	144	3	Y	N	N	N	N	YL
SUBRAMANI	50	M	Y	N	2	2	Y	N	N	N	176	154	2	Y	N	N	N	N	YL
RAJENDRAN	52	M	Y	N	2	2	N	N	N	N	102	91	3	N	Y	N	N	N	YL YR
SHANKAR	52	M	Y	N	2	1	Y	Y	N	N	168	144	2	N	N	N	N	N	N
KRISHNAN	68	M	Y	N	2	2	Y	Y	Y	N	186	164	3	N	N	Y	N	YR	YL YX
BENJAMIN	61	M	Y	N	2	1	N	N	N	N	216	178	3	Y	N	N	N	N	YL
KUPPUSWAMY	54	M	Y	N	2	1	N	N	Y	N	142	99	2	Y	N	N	N	N	YL
SURESHKUMAR	48	M	N	Y	2	2	Y	N	Y	N	173	184	2	Y	N	N	N	N	YR
KARUPIYAN	45	M	N	Y	3	2	N	N	Y	N	142	164	2	Y	N	N	N	YX	N
JAYARAMAN	50	M	Y	N	2	1	N	N	Y	Y	141	125	2	N	N	N	N	N	N
SIVAKUMAR	28	M	Y	N	2	2	N	N	Y	N	136	172	3	Y	N	N	N	N	YL
SUBBIYA	54		N	Y	2	2	Y	N	N	N	196	174	1	Y	N	N	N	YL	N
BABU	38	M	Y	N	3	2	N	N	Y	Y	189	130	3	Y	N	N	N	YL	N
SUBRAI MAN	61	M	Y	N	3	2	Y	N	Y	N	197	154	3	N	Y	N	YL	YR	YL
MANIKANDAN	50	M	Y	N	2	2	Y	N	Y	N	180	162	3	N	N	Y	N	YX	YL YR
RAJASEKAR	51	M	Y	N	2	2	Y	Y	Y	N	174	144	3	N	Y	N	N	YL YX	N
DHANAPAL	60	M	Y	N	2	2	Y	Y	Y	Y	184	148	3	N	N	Y	N	YR YX	YL
KARNAKARAN	46	M	Y	N	2	2	Y	Y	Y	N	210	160	2	Y	N	N	N	YL	N
DAMODHARAN	60	M	Y	N	2	1	Y	Y	Y	N	216	142	3	N	Y	N	N	YL	YR

NAME	TOTAL OCCLUSION	LAD TYPEA	LAD TYPEB	LAD TYPEC	RCA TYPEA	RCA TYPEB	RCA TYPEC	LCX TYPE A	LCX TYPEB	LCX TYPE C	LEFT MAIN	TIMI FLOW	TL	TR	TX	DOMINANCE	ANGINA	1TIMI IN IRA
SUBRAMANI	N	N	N	N	N	N	N	N	N	N	N	3	3	3	3	1	N	3
SIVASHANMUGAM	N	N	YL	N	N	N	N	N	N	N	N	TL1	1	3	3	1	Y	1
KRISHNAN	N	N	Y	N	Y	N	N	Y	N	N	N	TL2 TX2 TR2	2	2	2	1	Y	2
GOVINDARAJ	N	N	N	N	N	N	Y	N	N	N	N	TR2	3	2	3	1	N	2
SHANKAR	N	N	Y	N	N	N	N	N	Y	N	N	TL2 TX2	2	3	2	1	Y	2
RAJENDRAN	N	N	Y	N	N	N	Y	N	N	N	N	TL1 TR2	1	2	3	1	N	2
GANESAN	N	Y	N	N	N	N	N	N	N	N	N	TL1	1	3	3	1	N	3
JAWARILAL	N	N	Y	N	N	N	N	N	N	N	N	TL2	2	3	3	1	N	2
ANANDAN	YL	N	N	Y	N	Y	N	N	Y	N	N	TL0,TR2,TX2	0	2	2	1	N	0
PERMAL	N	N	Y	N	N	N	N	N	N	N	N	TL2	2	3	3	1	Y	2
SUBRAMANI	N	N	Y	N	N	N	N	N	N	N	N	TL2	2	3	3	1	N	2
RAJENDRAN	N	N	Y	N	N	Y	N	N	N	N	N	TL2 TR2	2	2	3	1	N	2
SHANKAR	N	N	N	N	N	N	N	N	N	N	N	3	3	3	3	1	N	3
KRISHNAN	N	N	Y	N	Y	N	N	Y	N	N	N	TL2 TR2 TX2	2	2	2	1	Y	2
BENJAMIN	N	N	Y	N	N	N	N	N	N	N	N	TL2	2	3	3	1	N	2
KUPPUSWAMY	N	Y	N	N	N	N	N	N	N	N	N	TL2	2	3	3	1	N	2
SURESHKUMAR	N	N	N	N	N	Y	N	N	N	N	N	TR1	3	1	3	1	N	1
KARUPIYAN	N	N	N	N	N	N	N	N	Y	N	N	TL2	2	3	3	3	N	2
JAYARAMAN	N	N	N	N	N	N	N	N	N	N	N	TL2 TR2	2	2	3	1	Y	2
SIVAKUMAR	YL	N	Y	N	N	N	N	N	N	N	N	TL0	0	3	3	1	Y	0
SUBBIYA	N	N	Y	N	N	N	N	N	N	N	N	TL2	2	3	3	1	Y	2
BABU	N	Y	N	N	N	N	N	N	N	N	N	TL2	2	3	3	1	N	2
SUBRAI MAN	YL	N	N	Y	N	N	Y	N	N	N	N	TL0 TR1	0	1	3	2	N	0
MANIKANDAN	N	N	Y	N	Y	N	N	N	N	Y	N	TL2 ,TR2,TX0	2	2	0	1	N	2
RAJASEKAR	N	Y	N	N	N	N	N	Y	N	N	N	TL2 TX2	2	3	2	1	N	2
DHANAPAL	N	N	N	Y	N	N	Y	N	Y	N	N	TL0 TX2 TR2	0	2	2	1	N	0
KARNAKARAN	N	N	YL	N	N	N	N	N	N	N	N	TL2	2	3	3	1	N	2
DAMODHARAN	N	N	YL	N	N	YR	N	N	N	N	N	TL2 TR2	2	2	3	1	N	2

CONSENT FORM

I hereby consent to participate in the above study

Signature of the Participant

Information to Participants

Title : ANGIOGRAPHIC PROFILE IN PATIENTS WITH FAILED THROMBOLYSIS

Principal Investigator: Dr.M.SARAVANAN

Co-Investigator (if any):

Name of Participant:

Site: RGGGH& MMC, Chennai

You are invited to take part in this research/ study/procedures/tests. The information in this document is meant to help you decide whether or not to take part. Please feel free to ask if you have any queries or concerns.

What is the purpose of research?

IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION, WHAT IS THE RATE OF THROMBOLYSIS FAILURE, ANGIOGRAPHIC LESION CHARACTERISTIC IN PATIENTS WITH FAILED THROMBOLYSIS. we have obtained permission from the institutional ethics committee.

The study design

It is a Prospective study.

Study Procedures

- The study involves evaluation at the bedside clinically, electrocardiographically, and angiographically in patients with failed and successful thrombolysis.

Confidentiality of the information obtained from you

You have the right to confidentiality regarding the privacy of your medical information (personal details, results of physical examinations, investigations, and your medical history). By signing this document, you will be allowing the research team investigators, other study personnel, sponsors, Institutional Ethics Committee and any person or agency required by law like the Drug Controller General of India to view your data, if required.

The information from this study, if published in scientific journals or presented at scientific meetings, will not reveal your identity.

How will your decision to not participate in the study affect you?

Your decision not to participate in this research study will not affect your medical care or your relationship with the investigator or the institution. You will be taken care of and you will not lose any benefits to which you are entitled.

Can you decide to stop participating in the study once you start?

The participation in this research is purely voluntary and you have the right to withdraw from this study at any time during the course of the study without giving any reasons. However, it is advisable that you talk to the research team prior to stopping the treatment/discontinuing of procedures etc.

Signature of Investigator Signature of Participant

Date Date

PATIENT CONSENT FORM

STUDY TITLE: **"Coronary angiographic profile in patients with failed thrombolysis"**

Patient may check (✓) these boxes.

PARTICIPANT NAME: DATE:

AGE: SEX: I.P.NO. :

The details of the study have been provided to me in writing and explained to me in my own language. ☐

I confirm that I have understood the purpose of the above study. I have the opportunity to ask the question and all my questions and doubts have been answered to my complete satisfaction. ☐

I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving any reason, without my legal rights being affected. ☐

I understand that investigator, the institution, regulatory authorities and the ethical committee will not need my permission to look at my health records both in respect to the current study and any further research that may be conducted in relation to it, even if I withdraw from the study. I understand that my identity will not be revealed in any information released to third parties or published, unless as required under the law. ☐
I agree not to restrict the use of any data or results that arise from this study.

I hereby consent to undergo complete physical examination, and diagnostic tests including hematological, biochemical, radiological and urine examinations ☐

I have been given an information sheet giving details of the study ☐

INSTITUTIONAL ETHICS COMMITTEE

MADRAS MEDICAL COLLEGE, CHENNAI – 600 003.

EC Reg. No. ECR /270/Inst/TN/2013

Telephone No. 044 25305301

Fax 044 25363970

CERTIFICATE OF APPROVAL

To

Dr .M.SARAVANAN ,

Post graduate in DM Cardiology,

Department of Cardiology,

Madras Medical College, Chennai 600 003.

Dear Dr .M.SARAVANAN,

The Institutional Ethics Committee of Madras Medical College , reviewed and discussed your application for approval of the proposal CORONARY ANGIOGRAPHIC PROFILE IN PATIENTS WITH FAILED THROMBOLYSIS

The following members of the Ethical Committee were present in the meeting held on 11.12.2013 conducted at Madras Medical College, Chennai – 3.

1. Dr .G.Sivakumar , MS FICS FAIS Chairperson
2. Prof.B.Kalaiselvi , MD
   Vice Principal, MMC, Ch3 Member Secretary
3. Prof.Ramadevi ,
   Director i/c, Institute of Biochemistry, Chennai Member
4. Prof .P.Karkuzhali , MD;
   Prof.Inst .of Pathology, MMC, Ch 3 Member
5. Thiru .S.Govidasamy , BA., BL., Lawyer
6. Tmt .ArmoldSaulina , MA MSW Social Scientist

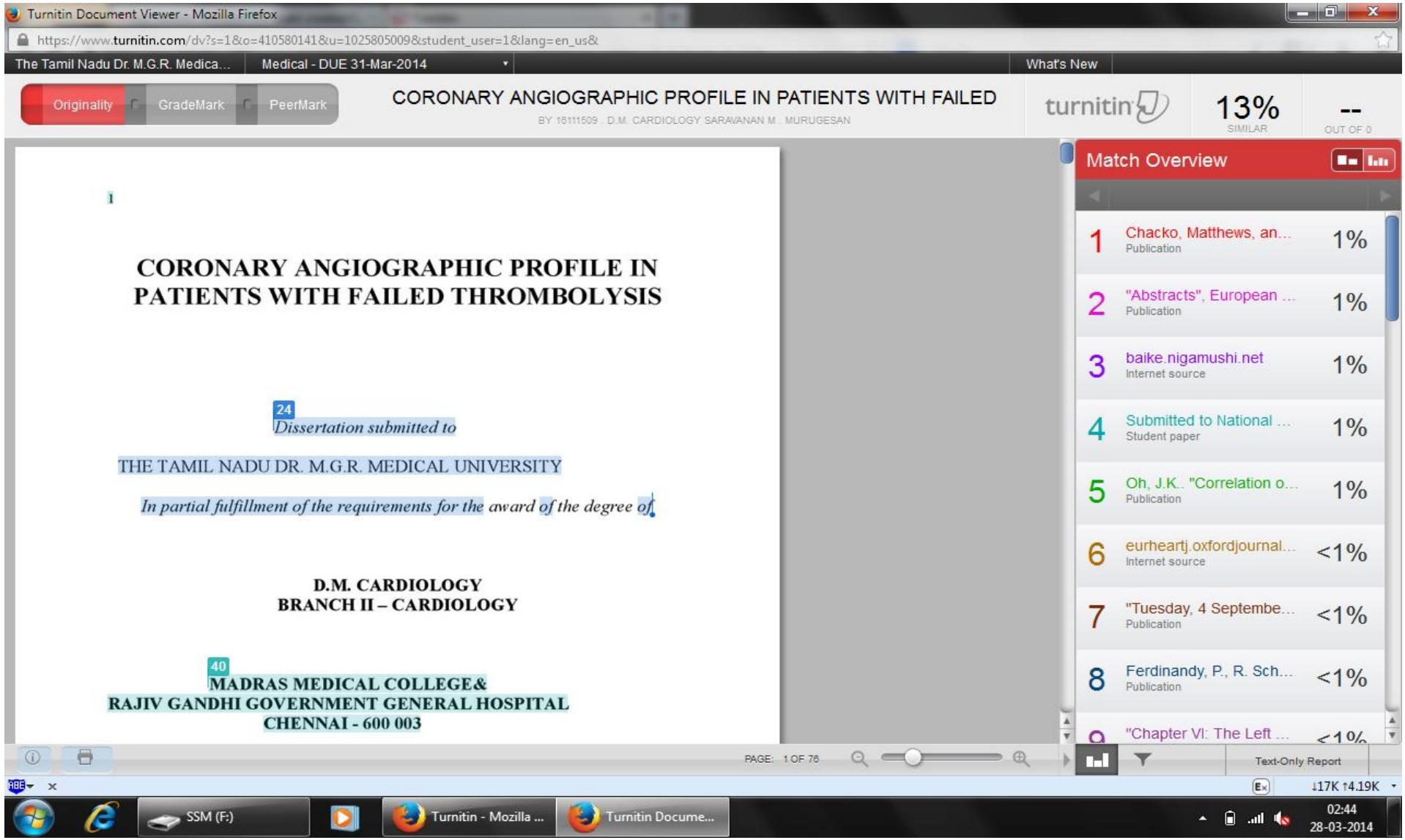
We approve the proposal to be conducted in its present form.
Sd / Chairman & other Members.

The Institutional Ethics Committee expects to be informed about the progress of the study , and SAE occurring in the course of the study , any changes in the protocol and patients information / informed consent and asks to be provided a copy of the final report.

3/1/14

Member Secretary , Ethics Committee

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE
CHENNAI-600 003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In partial fulfillment of the requirements for the award of the degree of
D.M. CARDIOLOGY
BRANCH II – CARDIOLOGY
MADRAS MEDICAL COLLEGE&
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